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Edited by
JOSEPH GRINNELL

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Associate Editor



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THE SURF-BIRD: NEST, EGGS, AND MALE PARENT; $\times \frac{1}{2}$.

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NUMBER 1

THE 'SURF-BIRD'S SECRET' WITH NINE ILLUSTRATIONS

BY JOSEPH DIXON

(Contribution from the Museum of Vertebrate Zoology of the University of California¹)

IN SPITE of the facts that the bird has been known to science for almost a century and a half and that many specimens have been collected, the Surf-bird (*Aphriza virgata*) has for many decades held the distinction of being the outstanding species among the very few North American birds whose nest and eggs have remained unknown. Because they have remained undiscovered for so many years, the eggs and nest of this bird have come to be specially sought for by ornithologists.

The Surf-bird was described by Gmelin in 1789 under the name *Tringa virgata*. The original bird came from the region now known as Prince William Sound, Alaska. *Aphriza* is now known to be a shore-bird characteristic of the Pacific coast of the Americas. It winters in South America as far south as the Straits of Magellan, and it breeds in central Alaska. Twice each year, in migration, it traverses the Pacific coast of both North and South America.

The writer has been unable to find any record of "young of the year" having been collected previous to 1856. In his Catalogue of Aquatic Birds exhibited by the United States National Museum at the Great International Fisheries Exhibition held in London in 1883, Robert Ridgway lists a juvenal specimen, no. 24256, of the Surf-bird taken at San Francisco, California, September 11, 1856, by J. Hepburn. (See Ridgway, 1883, p. 146.)

Dr. E. W. Nelson, Chief of the Bureau of Biological Survey, was one of the first ornithologists to gain any information as to the breeding of the Surf-bird. In his well-known report on the natural history of Alaska (1887, p. 128) he records "a young male taken at St. Michaels, August 19, 1879." From his detailed description it is clear that his specimen was a bird-of-the-year. During his four years (1877-1881) of exploration in Alaska, Dr. Nelson failed to find any Surf-birds during the nesting season. He states (*loc. cit.*): "The natives, however, claim that it is found breeding on the bare mountains in the interior." He must have been somewhat skeptical because he added "but they probably mistook it for some other bird." Dr. Nelson's specimen eventually reached the British Museum, through the Henshaw collection.

While on his initial trip to Alaska, Dr. Joseph Grinnell collected five adult Surf-birds at Sitka, on July 21, 1896. There was no proof that these five birds, three males and two females, had nested recently; but their capture gave weight to the theory that the breeding ground must be not very far to the northward of this point. On a

¹ Field expenses of this expedition were generously provided by Mr. John E. Thayer who also supplied the funds which enables THE CONDOR to print the colored plate accompanying this article. Mr. George M. Wright supplemented Mr. Thayer's contributions by granting free use of field notes and of the painting of the Surf-bird and its eggs, by Major Allan Brooks.

subsequent trip, to the Kotzebue Sound region of Alaska, Dr. Grinnell collected three adult Surf-birds on the Kowak River, on May 29, 1899. Two of these birds were "males with testes one-fourth inch in diameter." "The largest ovum in the female was one-eighth of an inch in diameter." An Indian of the neighborhood recognized the birds when they were shown to him and said that they nested "in mosquito time" about the small lakes far back on the tundra in the Selawik Range on the south side of the Kowak Valley. (See Grinnell, 1900, p. 29.) This evidence fixed the approximate time when the Surf-birds nest; and furthermore, it is doubtless the basis for the statements subsequently made that the breeding ground is "probably in the interior of northwestern Alaska."

During the past seventeen years the present writer has been a member of five expeditions to Alaska. During each of these trips, the unknown nest and eggs of the Surf-bird were kept in mind; but continued search produced only negative results so far as Surf-bird nests were concerned. Before and during this period many other naturalists, including A. M. Bailey, Bishop, Brandt, Brooks, Conover, Hendee, Mur-



Fig. 1. A TYPICAL SUMMER HABITAT OF THE SURF-BIRD IN THE MOUNT MCKINLEY DISTRICT, ALASKA; JUNE 6, 1926.

dock, Osgood, Swarth, and Walker, carried on field work in Alaska. While these men obtained little positive data regarding the nesting ground of the Surf-bird, the work of each has been important because it eliminated more and more of the possible territory where Surf-birds might have been expected to breed.

More recently, Mr. O. J. Murie, of the Biological Survey, while investigating caribou on the headwaters of the Forty-mile River on the divide between the Yukon and Tanana rivers, found, on July 13, 1921, a young Surf-bird, "probably from five to seven days old". This young bird was with its parents, one of which, the male, was collected. Mr. Murie again found Surf-birds high in the Alaska Range at the head of the Savage River, on July 4, 1923, recording that "a flock of twelve, evidently

non-breeders, were feeding on a high slope" (Murie, 1924, p. 236). Mr. Murie expressed the opinion (p. 237) that "The birds seen in the high Alaska Range were not nesting, but their presence there may be suggestive . . . and it is probable that later observations will prove the Surf-bird to be a summer resident of that section."

On May 27, 1924, Major Allan Brooks shot an adult Surf-bird at Carcross, Yukon Territory (Swarth, 1924, p. 73).

This was the Surf-bird situation in 1925 when the writer again became active in the quest. Profiting by his own previous experience as well as that of other naturalists who have worked in Alaska, he came to the conclusion that it was useless to look for eggs of the Surf-bird near the coast or even at low altitude. By a process of elimina-



FIG. 2. SURF-BIRDS WERE FOUND MOST FREQUENTLY AT THE FOOT OF SOME RUGGED CLIFF WHERE THE WHITE ALASKA SHEEP DWELL.

tion the search was narrowed down to the higher mountains of interior Alaska. A trip to the headwaters of the Forty-mile River was planned, but was abandoned because of illness and of the difficulty of transportation.

On May 3, 1926, through joint support and sponsorship of the University of California and Mr. John E. Thayer, the writer with Mr. George M. Wright as companion, started out on a three months' study of the birds and mammals of the Mount McKinley district of central Alaska. And at the same time we again took up the long, long trail of the Surf-bird. Upon our arrival at Mount McKinley Park on May 19 we were kindly received by Park Superintendent Karstens and members of his staff. To his helpful suggestions and assistance is due in large measure our ultimate success.

The south side of the Alaskan Range is in this region characterized by a heavy snow fall, while on the northern or interior slope the snow fall is relatively light. The

winter preceding our visit had been exceptionally mild, and we found the summer season at least two weeks ahead of normal when we arrived. It should be explained that nearly all of the Park in which we worked is above timberline, and this on the north slope of the Alaskan Range rarely extends above 3000 feet. Some adequate conception of the zonal complexion of the region may be had from the fact that Mount McKinley extends 17,000 feet above timberline. By May 20, the snow had melted on the open plains and lower ridges, but along the river bars where the snow had drifted, snowbanks four feet deep still existed. At this time the willows had not yet begun to leaf out. A thorough search along the rocky river bars revealed a pair of Wandering Tattlers evidently preparing to nest; but no trace of Surf-birds could be found, so we directed our search to higher ground.

At this season the foothills were subjected to spring snow storms which powdered them with white clear down to timberline (see fig. 1).

The Surf-bird's scientific name is derived from the Greek *aphros*, sea-foam, *zao*, I live. The common name also indicates the habit these birds have of feeding on out-lying reefs and rocks of the sea-shore, unmindful of the flying salt spray which sometimes breaks completely over them. During the fall, winter and spring the Surf-bird has been observed feeding upon barnacles and other small marine animals that it finds on the surf-washed rocks and reefs of the Pacific Ocean. During the major portion of the year the Surf-bird is thus a strictly littoral species, being rarely or never found away from the coast. This fact doubtless led to the belief that the nesting grounds of this species would also be located somewhere on the coast in the far north.

However, this has not proved to be the case. One of the most striking things about the Surf-bird is the remarkable difference between its winter and summer habitat. Near the end of their northward migration in the spring these birds abandon the sea coast and take up their summer residence far in the interior, from 300 to 500 miles from salt water. This involves a great altitudinal shift. Instead of living at sea level as they do at other seasons, during nesting time they are to be found on barren, rocky mountains high up above timber line. During the entire summer we never found these birds below 4000 feet elevation. With this marked change in habitat has come a corresponding great change in food and food habits. In summer, instead of living on sea food, the Surf-bird turns to an insect diet, living then almost entirely upon active insects which it captures by stealth or by fair chase in the open.

The rocky character of the Surf-birds' surroundings appears to remain fairly constant throughout the year. In summer the birds are to be found most frequently near the summits of the rock slides where the broken rocks are much the same as the rugged reefs they inhabit during the winter. We found in the Mount McKinley district that the summer range of the Surf-bird was almost identical with that of the Mountain Sheep and that it was useless to look for Surf-birds outside of "sheep" country.

On June 7 two Surf-birds were found feeding at 4200 feet elevation, among the little rivulets that tumbled over the cliffs directly from the melting snow above. One of these two birds was shot and proved to be a female which at this date had already laid a set of eggs. On June 18, three Surf-birds were seen close under the summit of a mountain. Here they occasionally ran about and picked up insects, but more often they stood still on exposed rocks and preened their feathers. One of these three birds frequently raised both wings, willet-fashion, over its back until they almost met. These individuals were exceedingly shy and would not allow the naturalist to approach closer than 100 yards. We found that this timidity was customary during the nesting season, when the birds were encountered away from the immediate vicinity of the nest.

At 8 o'clock on the evening of June 24, I climbed to the crest of a sharp ridge of one of the lower spurs of the main Alaskan Range. As I reached the highest peak four Surf-birds flew in from a distance. As they circled about the peak they called *tee, tee, teet*, loudly. Their flight was swift and plover-like. As they turned, the white basal portions of their tails, together with the white bars of their wings, formed four white V's which stood out vividly in the strong glow of the evening sun. They circled the peak several times, calling loudly and evidently seeking for others of their kind. Soon there was an answering call from the ground and the four birds settled down on a rocky spur where three other Surf-birds were already feeding. When I crawled up to within fifty yards of them all seven birds ceased feeding and began to call loudly. After a period of several minutes they began to feed again, one remaining on guard while the others ran hither and thither chasing insects over the rocks and



Fig. 3. THE MALE INCUBATED THE EGGS. THE NEST WAS ENTIRELY OUT IN THE OPEN, ON A BARREN ROCKY RIDGE, 1000 FEET ABOVE TIMBER-LINE.

tundra. I watched them feeding for nearly an hour, but it was obvious that this was a feeding and not a nesting ground. At 9:40 o'clock in the evening, just as the last rays of the setting sun vanished from the crest of the ridge, the Surf-birds arose suddenly and flew away to a higher peak where the sun was still shining, and insects were still active.

Three days later, seven Surf-birds were found feeding in company at mid-day near this same spot. This time they were foraging near the top of a very steep talus slope that lay fair to the sun. Only a few scant flowers grey amid the rocks, but insects were numerous and active. One Surf-bird which, when later collected, proved to be a male stood guard while the others fed. The slightest movement on my part was sufficient to cause a warning note to be given by this sentinel. When feeding,

these birds ran hurriedly over the rocks, traveling as fast or faster than a man could walk. When an insect was sighted the pursuing Surf-bird would stretch out its neck as far and as straight as possible. Then moving stealthily forward the bird would make a final thrust and secure the insect in its bill, much in the same manner that a turkey stalks a grasshopper.

Stomachs of Surf-birds collected in the Mount McKinley district were preserved and submitted to the Bureau of Biological Survey for detailed examination. Mr. Charles C. Sperry, of the Division of Food Habits Research, of the Survey, examined the material and reports as follows.

No. 175612 Biol. Surv. (8735 J. D.), female, June 7, 1926: condition of stomach, full; percentage of animal matter, 100; gravel, etc., 20; contents, Carabidae: fragments of 5 *Carabus truncaticollis*, 6 *Cryobius* sp., 6 *Curtonotus brunnipennis*, and 1 unidentified, 30%; 5 *Chrysomela subsulcata*, 24%; 1 *Cytilus sericeus*, 2%; weevils: 3 *Lepidophorus lineaticollis*, 3 *Lepyris*, and 1 *Dorytomus* sp., 24%; fragments of 1 *Cryptohypnus* sp., trace; remains of craneflies (Tipulidae), larvae, pupae, and adults, 16%; fragments of 3 Hymenopterons, trace; spider fragments, trace; fragments of several young snails (*Littorina*), 4%.

No. 175613 Biol. Surv. (8806 J. D.), male; date, June 20, 1926: condition of stomach, full; percentage of animal matter, 100; gravel, etc., 60; contents, Carabidae: *Platynus cupripennis* and 1 unidentified, 2%; weevils, 3 *Lepidophorus lineaticollis*, and 1 *Lepyris*, 34%; 2 *Cryptohypnus* sp., 3%; and another beetle (probably Melandryidae), 1%; Lepidoptera: 2 caterpillars and fragments of cocoons, 14%; Hymenoptera, including Ambletelinae and Nematinae, 18%; Diptera: remains of larval and adult craneflies (Tipulidae), 28%.

No. 175614 Biol. Surv. (8840 J. D.), female; date, June 24, 1926: condition of stomach, full; percentage of animal matter, 100; gravel, etc., 60; contents, fragments of *Carabus truncaticollis*, trace; 3 *Lepidophorus lineaticollis* and 2 *Lepyris*, 60%; Diptera: Remains of Tipulidae and Dolichopodidae, 34%; 2 caterpillars, 2%; Hymenoptera: fragments of Ichneumoninae, 2%; fragments of a Phalangid, 2%.

No. 175615 Biol. Surv. (8841 J. D.), male; date, June 24, 1926: condition of stomach, full; percentage of animal matter, 100; of gravel, etc., 80; contents: Beetle fragments (Carabidae), trace; Craneflies (Tipulidae), pupae, adults, and eggs, 95%; Hymenoptera: including an ant (*Tapinoma* sp.) and a sawfly (*Dolerus* sp.), 5%; fragments of a moth, trace.

No. 175616 Biol. Surv. (8842 J. D.), male; date, June 24, 1926: condition of stomach, full; percentage of animal matter, 100%; of gravel, etc., 50; contents: fragments of *Cryobius* sp., 6%; fragments of *Chrysomela subsulcata*, 1%; 5 *Lepidophorus lineaticollis*, 15%; 1 caterpillar, 1%; 2 bugs (Miridae) and fragments of Hymenoptera (Ichneumoninae), trace. Diptera: Remains of Tipulidae and Dolichopodidae, 75%; fragments of a Phalangid, 2%.

No. 175617 Biol. Surv. (8843 J. D.), male; date, June 24, 1926: condition of stomach, full; percentage of animal matter, 100; of gravel, etc., 70; contents: fragments of *Carabus truncaticollis*, 2%; weevils: 3 *Lepidophorus lineaticollis* and 1 *Lepyris*, 70%; fragments of *Chrysomela subsulcata*, trace. Hymenoptera fragments, 2%; Craneflies (Tipulidae), 24%; 2 small caterpillars, 2%; fragments of a Phalangid, trace.

No. 175618 Biol. Surv. (8844 J. D.), male; date, June 24, 1926: condition of stomach, full; percentage of animal matter, 98; of vegetable, 2; of gravel, etc., 55; contents: fragments of Carabids (inc. *Cryobius* sp.), 4%; fragments of *Chrysomela subsulcata*, 4%; 1 *Lepidophorus lineaticollis*, 2%; 1 *Byrrhus* sp., 2%; remains of craneflies (Tipulidae), 72%; Lepidoptera: fragments of cocoon and 2 caterpillars, 12%; Hymenoptera: fragments, trace; fragments of a Phalangid, 2%; 2 seeds of *Oxytropis* sp., 2%.

No. 175619 Biol. Surv. (8859 J. D.), male; date, June 27, 1926: condition of stomach, full; percentage of animal matter, 100; of gravel, etc., 30; contents, Carabid fragments (including *Carabus truncaticollis*), trace. Fragments of a weevil (*Lepyris*) no. 175614, 2%; fragments of 2 Hymenopterons, trace. Remains of many craneflies (Tipulidae), 98%.

SUMMARY OF FOOD OF THE SURF-BIRD DURING THE NESTING PERIOD

Number	Sex	Coleoptera	Hymenoptera	Diptera	Lepidoptera	Phalangidea	Snails	Plant Seeds
175612	♀	80%	.....	16%	.....	.....	4%	.....
175613	♂	40%	18%	28%	14%	.....	.....	.....
175614	♀	60%	2%	34%	2%	2%	.....	.....
175615	♂	5%	95%	.....	.....	.....	.....
175616	♂	22%	.....	75%	1%	2%	.....	.....
175617	♂	72%	2%	24%	2%	.....	.....	.....
175618	♂	12%	.....	72%	12%	2%	.....	2%
175619	♂	2%	.....	98%	.....	.....	.....	.....
Average		36.0%	3.3%	55.2%	3.8%	1.0%	.5%	.2%

By watching, with binoculars, Surf-birds that were feeding it was possible to identify many of the insects that were being captured. The larger insects, such as beetles, were the ones most readily identified and recorded, and the author's observations made in the field check closely with stomach examinations made in the laboratory. From the accompanying table of stomach examinations it will be seen that insects form 98.3% of the Surf-bird's food during the breeding season. Diptera (flies) head the list, forming over one-half (55.2%) of the stomach contents, while Coleoptera (beetles) were second, forming 36% of the Surf-bird's summer diet.

During May the new snow rarely lasted more than a day or two, but along the crest of the ridges at 6000 feet it merely added to the previous winter's snow which still lay waist deep in many places. It seemed highly improbable that even Surf-birds would be found at the extreme crests, but we continued our search upwards until stopped by snowslides that were too steep to cross or by unscalable cliffs. We failed to find any sign of Surf-birds during the first week's search, and since we rarely found *Leucostictes* above 5000 feet we decided to hunt lower down along the rock slides and talus slopes at bases of cliffs (see fig. 2).

When standing on a barren wind-swept ridge late in the afternoon of May 28, searching a nearby hillside with binoculars, Mr. Wright's attention was attracted to a grayish bird that was sneaking hurriedly along over the rocky ground. As he watched, the bird apparently faded out of sight some six hundred feet away. Marking the point of disappearance he hurried over to the spot where the bird was last seen and, failing to find the bird, began to think he was mistaken. But, upon his taking one more step, the bird flew up suddenly right into his face, startling him mightily. As the bird flew away, the large white rump patch, together with a white patch on either wing, brought realization that this was the long-sought-for Surf-bird. A hasty glance at his feet revealed the nest and contents of four eggs. Another step forward and he would have placed his foot directly in the nest! To George M. Wright belongs the honor of being the first white man, of which we have any record, to lay eyes on the nest and eggs of this rare bird.

The Surf-bird's nest was located 1000 feet above timberline on a rocky ridge that faced southwest and lay fair to the sun and hence was relatively free from snow. The nest site was on dry rocky ground and not on the wet tundra which was plentiful nearby. The rocky ground about the nest was clothed with a thin carpet of alpine-arctic vegetation, the tallest of which were a few creeping arctic willows less than two inches high (see colored frontispiece). The most conspicuous plant about the nest was the white-flowered *Dryas integrifolia*. The nest was entirely out in the open with no bushes to afford the least concealment (see fig. 3). In fact it was almost "out in the street", since the eggs were within a foot of a frequently traveled trail of the white Alaska Mountain Sheep (*Ovis dalli*). There was no fabricated nest such as the Wandering Tattler makes. Instead, the eggs were deposited in a natural erosional depression, the sides of which had been lined with a few bits of dried-up grayish green lichens and caribou moss (see fig. 4). The bottom of the nest was composed of the

dead-emarginate leaves of *Dryas integrifolia*, which only partially covered the crumbling serpentine outcrop that formed the backbone of the ridge. The nest, which was barely large enough to hold the four eggs, which were placed as close together as possible, with little ends down, measured four inches in diameter and an inch and a half in depth. The eggs in the nest blended so well with the reddish brown moss of the tundra that it became difficult to make them out at a distance of more than eight or ten feet.

The eggs of the Surf-bird (see fig. 4) are not easily confused with the eggs of any other North American sandpiper or plover. In shape they are pyriform but, though similar in form to eggs of other birds of the order Limicolae, in color they appear more like eggs of the falcons, particularly certain eggs of the Sparrow Hawk and Prairie Falcon.



Fig. 4. THE NEST WITH ITS FOUR EGGS, HERE SHOWN NATURAL SIZE, WAS LOCATED IN A NATURAL EROSIONAL DEPRESSION.

In the type set, which is now safely housed in the well-known Thayer collection, there is considerable variation both in the ground color and in the markings of the eggs. Three eggs of this set have an intensely buffy ground color, while the fourth egg is of the same color but decidedly lighter. The markings on the three eggs are bold, varying in color from Fawn color to Bay. (In this article color terms beginning with capitals are from Ridgway, 1912.) The markings on the fourth egg are small and evenly distributed. The four eggs may be described as follows. The first egg has a light ground color which equals Tilleul-buff. In this egg the marking consists of fine splashes, $\frac{1}{2}$ to 2 millimeters in length. There is but slight tendency for the markings to form a wreath on the larger end. A few small dark brown spots on its

larger end identifies this egg, which resembles slightly certain eggs of the Yellow-billed Magpie. In egg number two the ground color is rich Tilleul-buff, while the markings consist of bold Bay-colored spots and splashes from $\frac{1}{2}$ to 3 millimeters in length. These spots are concentrated about the larger end of the egg, where in places they are so dense as completely to obscure the ground color. A few deep-seated lavender under-shell markings are apparent on this egg. Egg number three is similar both in ground color and in markings to egg number two, except in egg number three the heavy Bay markings form a decided wreath 21 millimeters in diameter about its larger end. Egg number four has the richest ground color of all, while its markings are Fawn, but the markings are not so sharply defined as in the other eggs.



Fig. 5. MOUNTAIN SHEEP GRAZED DAILY OVER AND AROUND THE SURF-BIRD'S NEST.

The four eggs measured, in millimeters, and weighed, in grams, as follows:

MEASUREMENTS AND WEIGHTS OF FOUR SURF-BIRD EGGS

	Length	Breadth	Weight
	43.7	30.5	19.8
	41.5	31.5	20.0
	43.3	31.2	20.1
	42.4	31.0	20.1
Average	42.7	31.0	20.0

All the eggs were fertile with well-developed embryos in each. They had been incubated about one week, I judged. This would indicate that the eggs had been laid about May 20. It was our experience that the Surf-bird nested earlier than any other of the several species of shore-birds that we found breeding in the Mount McKinley district. We found, in the sexual organs of these birds, that breeding evidence had almost disappeared by the last of June, after which date breeding birds might easily have been mistaken for non-breeders.

Desiring to spend as much time as possible at the nest, both to observe the birds and also to protect the nest from being trampled under the hoofs of numerous mountain sheep that foraged daily (see fig. 5), and bedded down nightly, all around the Surf-bird's nest, we took notebooks, binoculars, and still and movie cameras and spent the entire night and half of the next day at the nest. It was almost 9 o'clock in the evening when we arrived at the Surf-bird's nest. Since it was cold and late we did not disturb the incubating bird, but only took a few photographs in the fast fading light.

In order to be able to watch the nest continuously we piled up a crude shelter of rocks on the crest of a ridge overlooking the nest and about 80 feet distant from it. This gave us protection from the biting wind, but the rain which began to fall about 10 o'clock soon turned to snow. When it began to rain, the Surf-bird merely fluffed up and then spread out the feathers on his back so as completely to cover the nest (see fig. 6). This proved an effective method, because the melting snow and the rain



Fig. 6. THE MALE SURF-BIRD ON THE NEST. DURING SNOW STORMS THE BIRD'S FEATHERS WERE SPREAD OUT AS HERE SHOWN, KEEPING THE EGGS WARM AND DRY.

ran readily off the Surf-bird's back and was absorbed by the moss outside the nest. We were not so well protected and were soon shivering and wet to the skin.

From 11 o'clock in the evening until one o'clock the following morning it was too dark to read print or to see to write, but the rest of the "night" was only twilight. Shortly after midnight, when the sky became brighter, the wind lulled, and the snow ceased for the time being; then the clear sprightly song of an Intermediate Sparrow came up to us in the mist from the drenched willow thickets below. At one o'clock in the morning an unseen male Rock Ptarmigan cackled hoarsely, off in the dense clouds that surrounded us.

At four o'clock, a female mountain sheep appeared, silently, like a ghost, out of the mist that came drifting over the mountain peaks in great white swirls. She did not see us at first, but when she was within six feet of, and headed directly toward, the Surf-bird's nest, she became suddenly aware of our presence and took a step or two

forward. When the ewe was about to step on the nest the Surf-bird suddenly "exploded" right in the astonished animal's face. This unexpected movement and the sudden noise and flash of white of the bird's spread wings and tail caused the mountain sheep to jump back quickly; then she whirled around and bounded off back up the trail. This sudden movement of the Surf-bird at the critical moment doubtless serves to prevent sheep and caribou from trampling upon its nest and eggs. We found through repeated experiments that this was the bird's regular reaction. When we approached, whether fast or slow, the bird would stay on the nest until the last minute and then instead of sneaking off low to the ground, like most birds do, would fly directly up into our faces. Even after we knew that the bird would do this, the psychological result on our part was the same. A person would involuntarily recoil when the bird "exploded", like a fire-cracker, right in his face.

We left the Surf-bird's nest covered with a flat rock, after the eggs had been removed, and coming back several days later found that a mountain sheep had come down the hill, knocked the rock off the nest, and stepped into the nest, the hoof prints being exactly where the eggs had been.

The nest was visited by one or the other of us at hourly intervals all through the night, and we always found the Surf-bird faithfully on the job. The only noticeable change was in the bird's shifting a quarter turn around on the nest so as to face the wind.

When first frightened off the nest by Mr. Wright the previous afternoon, the bird, which we later thought might have been the female, after "exploding" ran away with wings half spread and the tail spread out fan-like and dragging on the ground. This displayed conspicuously the white rump patch. Now and then this bird would nestle down as though covering a nest. When about one hundred yards distant from the nest the bird began to wander about, pretending to feed. It exhibited no concern whatever when Mr. Wright returned to the nest and examined the eggs. It made no attempt to return to the nest even after the observer had retired to a distance and waited for a period of ten minutes, during which interval rain began to fall.

In marked contrast with this rather indifferent attitude, the bird which was watched on the nest for sixteen hours, behaved in an entirely different manner. This second bird, when forced off the nest, would fly directly up into the intruder's face, and then run off to one side, a distance of eight or ten feet, where it would perch on a rock (see fig. 7), fluff out its feathers like a "sitting" hen and utter a low plaintive call, *tee-tee-tee!* The call would often be repeated two or three times after a slight pause of half a minute between calls. When we started after this bird it would lead us adroitly away from the nest; but if we stood still it would soon hustle directly back, even when we were standing only ten feet distant. In going on to the nest the bird was very careful not to step directly upon the eggs. It would trot up to within a foot or so of the eggs and then sneak cautiously down to the edge of the nest. Here it would stop, inspect the eggs, and reach out with its bill and turn the eggs about (see fig. 8), keeping them little ends down. Following this inspection the bird fluffed out the feathers on its breast and sitting down gently on the edge of the nest, slid its body forward with great care, until the eggs were completely covered.

When frightened off the nest, this Surf-bird sometimes picked up small grass seeds and insects from bare places in the rocks, but during the sixteen hours that we watched, it never once left the nest voluntarily, and it always returned to the eggs within three or four minutes. The bird seemed to realize that the eggs would chill fatally if left uncovered for any length of time, and doubtless they would have done so, for my fingers after a while became so stiff and cold that I was unable to work the cameras.

Only the one Surf-bird put in an appearance at or near the nest during our entire stay of a day and a half. This bird, which was incubating, was at first presumed to be the female because of its evident anxiety for and care of the eggs. The bird was under close constant observation from early morning until noon, when it was collected just as it left the nest. Imagine our surprise upon preparing the specimen to find that it was not a female at all, but a male bird with well developed testes which were almost half an inch long.

During subsequent observations, when both sexes were present, as was revealed by our taking specimens, we were unable to find any clew of plumage, size, voice or behavior whereby we could distinguish in the field male Surf-birds from females of the species. However, with specimens in the hand during the breeding season we found that five males collected all had bare incubation patches or egg pockets on their



Fig. 7. THE "MATERNAL" MALE SURF-BIRD COMPLAINING BECAUSE HE HAD BEEN DRIVEN OFF HIS NEST.

lower breasts, while none of the females shot had these. At this season, June, the males were thin, supposedly from sitting on the nest. The average weight of five breeding males was thus 126.2 grams. Contrasted with this, two females collected had no incubation patches and both were fat, weighing 150 and 151.1 grams, respectively. From close observation, checked up by careful sexing of specimens collected, it is my belief that in the Surf-bird the male does most, perhaps all, of the incubation. Since we found breeding males feeding together in small companies of three and four, away from their nests, it is still possible that the female remains on the nest while the male is off feeding and vice versa. It should be noted that I took opportunity to observe and to check up on this point in other shore-birds of the region, particularly in the case of the Wandering Tattler and the Semipalmated Plover. I found that in both these species the males did a large part of the incubation and that it was the males and not the females that were most fearless in the face of danger when caring for their young.

After several seasons experience with breeding shore-birds in the north, the writer has come to believe that in more of our *Limicolae* than is generally known, it is a common practice for the males to take a leading part in domestic duties not only in incubation but also in the care and training of the downy young. (See Dixon, 1918, p. 398.)

One interesting feature, that of the rapid fading of the nuptial plumage of the Surf-bird, has received scant attention. There is now sufficient material in the Museum of Vertebrate Zoology to show clearly when and how the rufous tone of the back is acquired and how and when it is lost. On March 31, 1926, Mr. Chester C. Lamb of the Museum staff collected ten Surf-birds, eight males and two females, at San Felipe near the mouth of the Colorado River, in the Gulf of California. Of these ten birds all but two had acquired, by molt, more or less of the rufous nuptial feathers on the scapulars. Some birds apparently do not acquire this plumage until the last of April, since a female, M. V. Z. no. 9874, collected April 29, 1909, by H. S. Swarth on Kuiu Island, southern Alaska, showed no rufous at all on the back. On the other



Fig. 8. MALE SURF-BIRD INSPECTING EGGS AND "TURNING" THEM WITH HIS BILL BEFORE SETTLING DOWN ON THE NEST.

hand another female, M. V. Z. no. 9875, taken May 3 at the same locality, is in full breeding plumage. In this latter specimen the scapulars and one tertial are broadly banded near the tip with rich Cinnamon-rufous. The feathers on the top of the head and neck are also margined with Cinnamon-rufous, giving a brownish tone to these regions. (See colored frontispiece.)

In breeding birds we found that in a certain specimen (no. 8735 J. D.) the scapulars had faded to Cinnamon-buff, while in another collected the last of June (no. 8844 J. D.) the rufous markings of the scapulars had faded to white. In many instances the light-colored ends of the feathers have actually worn away leaving a more resistant black tip exposed. In this way the top of the head and neck also become

clearer gray, mixed black and white. Fading and resultant wear in the Surf-bird is similar to that which takes place in the male Snowflake in the spring, when the buffy tips of the feathers fade and wear off, leaving the back black.

During the period between May 19 and July 30, which was spent in the Mount McKinley district, we walked approximately 500 miles, much of the country traversed being high up on the mountain slopes in good Surf-bird country. During this entire time we kept particular watch, but in spite of this attention we encountered Surf-birds only seven times during 72 days spent in the field. Many days were spent searching for Surf-birds in good territory without either of us finding a single bird of this species. Rarely were more than one or two Surf-birds encountered in any one day. The largest flock found consisted of seven adults.

After the first Surf-bird nest was discovered we thought it would be possible to find others, since we would know better just where to look for them. This did not prove to be the case, for continued search failed to reveal any other nest. Later in the season, when downy young of the Wandering Tattler were out, we made special effort to locate downy young of the Surf-bird. Although we searched again over the territory where we had found Surf-birds present earlier in the season, we did not succeed in finding any downy young of the Surf-bird.

There are many hundred square miles of territory along the northern or interior slope of the main Alaskan Range in the Mount McKinley district which are suitable for Surf-birds during the breeding season. It seems probable, from our experience, that there are isolated pairs of nesting Surf-birds scattered at distant intervals over this territory. The small flocks of from three to seven adults that were found during the breeding season are believed to represent individuals which had banded together, temporarily, at feeding time in order to enjoy the benefits of mutual protection from natural enemies such as red foxes and gyrfalcons.

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Berkeley, California, October 25, 1926.

EMARGINATION OF THE LONG PRIMARIES IN RELATION
TO POWER OF FLIGHT AND MIGRATION

WITH ONE ILLUSTRATION

By C. K. AVERILL

THE KIND of wing best adapted to strong quick motion is of the long, pointed type as exemplified in such birds as swallows, swifts, terns and certain falcons. In a wing of this kind the primaries are of course long, and are narrow at the tip. A swallow is a passerine bird developed from some such form as a thrush or sparrow but differing in capacity for continuous flight, and in any group of similar birds superiority in flight is shown by approach to the hirundine form of wing.

A familiar example is seen in the wing of the Nighthawk compared with that of the Whip-poor-will. In some cases the narrowing of the primaries takes place abruptly, forming what is called an emarginate or attenuate primary. In the best developed case of emargination all of the inner web that projects beyond the secondaries, when the wing is opened, is affected. This is perhaps best exemplified in the Eagles, where the usual slow and easy motion that goes with a broad wing may be changed to a rapid beating of the wings that accompanies a great burst of speed. The emarginate primaries of the Fish Hawk are of the same form and for the same reason. The Falcons have less emargination, not from any lack of rapid wing movement, but because the whole primary is already narrow.

If emargination is a sign of power of flight we should be able, in such groups of birds possessing it that have migrations of varied lengths, to correlate amount of emargination with length of migration. The Owls of North America offer an opportunity.

The Barn Owls represent a tropical family only one species of which has obtained a foothold in the United States. There is no emargination at all. The following show slight emargination: Burrowing, Elf, Pigmy and six genera of tropical or sub-tropical distribution. A small degree of emargination occurs in the genus *Asio*, but the Short-eared Owl, reaching to Arctic regions and with an extensive distribution, has more than the Long-eared. The Screech and Barred and Acadian owls have only a little, but the Great Horned Owl shows a further advance, this bird being of a bold and vigorous nature and having in one race acquired arctic distribution, and the whitening plumage that is so common in that region.

The three species of owls that are strictly boreal are at once distinguished from all the others by the much more evident emargination. The Hawk Owl, Great Gray Owl and the Snowy Owl are limited to the far north in the breeding season and are common to both hemispheres. In winter the Hawk and Great Gray owls move south, in the east to northern New England, but the Snowy Owl goes farther south, even occasionally to the southern states.

The number of primaries affected by emargination in the owls may be as high as five or six, and in general the depth of the emargination is in proportion to the number. In order to save a lot of tedious description, I have copied the outlines of the North American owls from Ridgway's plates in his *Manual of North American Birds*. To his *Birds of North and Middle America* I am indebted for the information used in this article.

Emargination of the long primaries occurs in the genus *Tyrannus*. Here Ridgway notes a sexual difference, the females having less than the males. If the emar-

gination is less in the females and, by our thesis, in the southerly species, we should find the least degree in females of the southerly birds. This is so, as the following quotations from Ridgway will show, the comparison in each case being that of the female with the male.

T. tyrannus, north to Hudson Bay, female adult with "tips of longer primaries less attenuated". *T. verticalis*, western U. S., north to British Columbia, adult female with "tips of longer primaries much less attenuated". *T. dominicensis*, north to southern U. S., with "tips of longer primaries less distinctly attenuated". *T. vociferans*, north to southern Wyoming, with "tips of longer primaries not distinctly if at all attenuated". *T. cubensis*, of Cuba, with "tips of outer primaries indistinctly attenuated". *T. crassirostris*, of Mexico, with "outer primaries very slightly attenuated". *T. melancholicus*, north to southern border of U. S., with "tips of longer primaries much less distinctly attenuated, sometimes hardly at all". Emargination, then, reaches or approaches the vanishing point in females of the most southerly species.

Among birds of prey emargination is more strongly marked in large birds, presumably related to the larger and more swiftly moving prey they are able to capture, but in *Tyrannus* this is not so, the smaller birds showing more than the larger. This follows from the simple law that in any genus of tropical or semi-tropical birds



Fig. 9. OUTLINES OF LONG PRIMARIES OF NORTH AMERICAN OWLS, AFTER RIDGWAY, SHOWING INCREASE IN EMARGINATION AS THE RANGES OF THE SPECIES BECOME MORE NORTHERLY. 1, Barn; 2, Burrowing; 3, Elf; 4, Pigmy; 5, Long-eared; 6, Short-eared; 7, Screech; 8, Barred; 9, Saw-whet; 10, Great Horned; 11, Hawk; 12, Great Gray; 13, Snowy.

migrants are recruited from the smaller birds. I have been much interested in tabulating measurements of the different genera in this category and find the same rule holds good; for example: *Icterus*, *Piranga*, *Planesticus*, *Coccyzus* and, in the family we are considering, *Myiarchus*. The Whip-poor-will, one of the smaller of its genus, leads in the race for the north, and the Red-winged Blackbird leaves a larger relative in Mexico. In the Vireo family and in the Hummingbirds the larger members remain in the tropics.

The genus *Muscivora* has emarginate primaries, but there are only two species, both of southerly distribution and therefore not available for our study. It is well to notice that like *Tyrannus* this genus has a well developed wing, the only kind in which emargination occurs.

That the male in *Tyrannus* should show more emargination than the female is quite in accordance with our principle, since the male has the longer wing, at least in proportion to the tarsus; but to the question why the male requires more ability in flight than the female, no answer is ready.

Bridgeport, Connecticut, January 4, 1926.

NOTES ON THE LOCATION AND CONSTRUCTION OF THE NEST
OF THE CALLIOPE HUMMINGBIRD

WITH THREE ILLUSTRATIONS

By WINTON WEYDEMEYER

ASSUMING that the nesting habits of the Calliope Hummingbird throughout the northwesternmost county of Montana, where it is a common breeder, may largely be typical of the species, I give here information obtained in studying this bird in that locality and in examining a few more than twenty nests.

In Lincoln County the Calliope Hummingbird (*Stellula calliope*) nests along streams throughout most of the Canadian zone and downward into the upper borders of the Transition zone. During the nesting season and late summer it also frequents open mountains, ranging into the Hudsonian zone, and during May and August is commonly seen in the breeding areas of lower Transition zone species. Tree associations evidently have greater influence on its range than does elevation. In the eastern part of the county I have found the species to be common during the nesting season at 7000 feet, although I have never chanced actually to see a nest above 4800 feet. In the Kootenai Valley, near Libby, I have found it nesting abundantly at an elevation



Fig. 10. TRANSITION ZONE TYPE OF HABITAT OF THE CALLIOPE HUMMINGBIRD, ALONG THE KOOTENAI RIVER NEAR LIBBY, MONTANA, AT AN ELEVATION OF 2150 FEET.

of less than 2100 feet, and I have no doubt that it breeds below 1900 feet a few miles distant, in the lower end of the valley, the only place in Montana where so low an elevation occurs. Near Fortine, at 3000 feet, it does not nest.

Its nesting range here is almost identical with that of the Dipper (*Cinclus mexicanus unicolor*) and the Northern Varied Thrush (*Ixoreus naevius meruloides*). Other common birds that breed in the same immediate vicinity are, in the higher elevations: Slate-colored Fox Sparrow (*Passerella iliaca schistacea*), Audubon Warbler (*Dendroica auduboni*), Pileolated Warbler (*Wilsonia pusilla pileolata*), Western Golden-crowned Kinglet (*Regulus satrapa olivaceus*), and Audubon Hermit Thrush

(*Hylocichla guttata auduboni*); in the lower areas: Western Flycatcher (*Empidonax difficilis*), Western Winter Wren (*Nannus hiemalis pacificus*), Ruby-crowned Kinglet (*Regulus calendula*), and Willow Thrush (*Hylocichla fuscescens salicicola*).

By far the majority of the nests are built over creeks, or over roads or trails near streams or lakes. Of the twenty-one nests listed in Table I, fourteen were overhanging streams, three were in trees on the banks of streams, and the other four were overhanging roads or trails. Probably some pairs nest in the interior of woods, but I have never been able to find a nest there. In fact, not one of these nests was farther than two hundred yards from a stream.

TABLE I. LOCATIONS OF TWENTY-ONE CALLIOPE HUMMINGBIRD NESTS: TREE AND ASSOCIATION

Nest No.	Height	Tree	Approximate elevation, in feet	Location
1	60 ft.	<i>Picea engelmanni</i>	3200	Bank of swift mountain stream, Canadian zone, thick woods of Douglas fir, lodgepole pine, western larch, and Engelmann spruce (nests 1-5).
2	50 ft.	<i>Picea engelmanni</i>	3200	
3	40 ft.	<i>Pseudotsuga taxifolia</i>	3200	
4	70 ft.	<i>Picea engelmanni</i>	3200	
5	65 ft.	<i>Picea engelmanni</i>	3200	
6	60 ft.	<i>Abies lasiocarpa</i>	4800	Canadian zone, island in mountain stream.
7	80 ft.	<i>Thuja plicata</i>	2120	Arborvitae-spruce woods.
8	50 ft.	<i>Thuja plicata</i>	2085	Mixed broad-leaf and conifer woods; bank of creek.
9	70 ft.	<i>Tsuga heterophylla</i>	2120	Creek bank, woods of spruce, hemlock, and arborvitae.
10	120 ft.	<i>Thuja plicata</i>	2170	Heavy forest of yellow pine, hemlock, and arborvitae.
11	100 ft.	<i>Tsuga heterophylla</i>	2200	Broad-leaf and conifer woods along stream.
12	60 ft.	<i>Abies lasiocarpa</i>	4100	Douglas fir and alpine fir association, by creek.
13	60 ft.	<i>Picea engelmanni</i>	4000	Creek flat; broad-leaf, spruce, and alpine fir.
16	90 ft.	<i>Picea engelmanni</i>	2080	Bank of stream, spruce and Douglas fir woods (nests 16-18).
17	35 ft.	<i>Picea engelmanni</i>	2085	
18	70 ft.	<i>Picea engelmanni</i>	2080	
19	60 ft.	<i>Picea engelmanni</i>	3200	Along stream, heavy woods of spruce, hemlock, arborvitae, and Douglas fir (nests 19-21).
20	60 ft.	<i>Thuja plicata</i>	3170	
21	70 ft.	<i>Thuja plicata</i>	3125	
22	70 ft.	<i>Thuja plicata</i>	2050	Bank of stream, woods of arborvitae, spruce, larch, and yellow pine.
23	60 ft.	<i>Tsuga heterophylla</i>	2100	Creek bank; hemlock, spruce, cottonwood, and arborvitae.

To me this last-named fact seems strange. Why should this Hummingbird, which evidently feeds principally on open hillsides or in park-like country near lakes, place its nest in the dark, thick woods along creeks? In the upper part of the Canadian zone, in alpine fir associations, this does not seem so curious; for here the feeding grounds in many places reach down to the very edges of the creeks. But in the Transition zone region near Libby, where the species breeds much more abundantly, the nests are at considerable distances from the open hills. Considering the insects, probably more Diptera can be caught along the streams, but I believe that the greater share of the species of Hymenoptera, and possibly of Hemiptera, will be found in less dense woods. Likewise, most of the flowers which attract the Hummingbirds grow at a distance from the streams. In the creek flats, during the nesting season, the commonest flowers are white or faintly-tinted kinds—*Limnorchis viridiflora*, *Clintonia uniflora*, *Tiarella unifoliata*, *Fatsia horrida*, *Cornus canadensis*, *Pyrola* species, *Chima-*

phila umbellata, *Philadelphus Lewisii*, *Bossekia parviflora*, and *Linnea americana*; in the more open woods on the hillsides grow brightly-colored species of *Aconitum*, *Rosa*, *Lupinus*, *Vicia*, *Chamaenerion*, *Castilleja*, *Campanula*, and *Aster*.



Fig. 11. CANADIAN ZONE TYPE OF HABITAT OF THE CALLIOPE HUMMINGBIRD IN WESTERN LINCOLN COUNTY, MONTANA. THE SPECIES NESTS IN THE HEAVY TIMBER ALONG THE NUMEROUS MOUNTAIN STREAMS.

The inferences concerning the feeding habits of the species that are suggested by the preceding information are substantiated by what few observations I have made. During the nesting season I have commonly noted individuals feeding on the hillsides or on cultivated land, at a considerable distance from any nest; and have but rarely seen any birds feeding in the thick woods where the nests are located. This may in part be due, however, to the greater activity of males that may feed where they choose during this period.

The nest of this Hummingbird is placed in a coniferous tree. Within this limit, the choice of an individual tree appears to depend more upon the location than upon the species. In the higher elevations of Lincoln County, nests are placed in alpine firs. Along the streams of the Transition zone, the trees most commonly used are the Engelmann spruce, western hemlock, and arbovitae. I have found one nest in a Douglas fir, but have seen none in pines. Near Libby I have observed nests in three species of trees within a few yards of each other along a stream. Evidently, to suit the requirements of the birds, the tree must be a conifer standing on the bank of a creek, or beside a road or other opening in the forest, with one of its lowermost branches swinging free from all other foliage and commanding a clear view in practically all directions.

The word "lowermost" is used with a purpose. All the nests of this species that I have seen have been placed on the lowermost living branch on its side of the tree. This habit determines the height of the nest above the ground or water. In the region considered here the distance generally ranges from four to ten feet.

The nest is placed near the end of the branch, usually saddled on the main stem or on a horizontal fork, but often semi-pensile from lateral twigs. Table II gives these particulars for some Lincoln County nests.

TABLE II. SITUATION OF TWENTY-ONE CALLIOPE HUMMINGBIRD NESTS

Nest No.	Height from ground or water (feet)	Distance from trunk of tree (feet)	Distance from tip of branch (inches)	Situation and method of support
1	10	5	48	Over creek, saddled on lowest limb.
2	6	4	12	Over creek, saddled on lowest limb.
3	8	4	24	Over creek, saddled on lowest limb.
4	7	6	36	Over stream, semi-pensile from lateral twigs.
5	5	8	18	Over stream, saddled on branch.
6	8	5	10	Over stream, saddled on branch.
7	9	10	24	Over road, saddled on lowest limb.
8	6	4	24	Over road, near creek, saddled on limb.
9	8	6	24	Over creek, placed on fork of branch.
10	4	10	18	Over trail, on fork of branch.
11	7	7	30	Over road, saddled on branch.
12	8	6	24	Over road, saddled on branch.
13	10	4	3	Over creek, saddled on tip of lowest branch.
16	4	8	18	Beside creek, saddled on branch.
17	8	8	18	Over creek, semi-pensile from lateral twigs.
18	11	10	24	Over creek, saddled on lateral branch.
19	10	8	12	Over creek, semi-pensile from small branches.
20	10	4	18	Over creek, saddled on limb.
21	6	3	12	Beside creek, semi-pensile from small twigs.
22	8	4	14	Over creek, saddled on limb.
23	7	0	72	On limb, against leaning trunk, over creek.
Average	7.6	6	23	

Examination of fourteen nests showed that two of them had been used for three years, and three others for two different seasons. A new layer of down within the cup, and in some cases additions to the sides, prepared each nest for its second occupancy. The successive layers of down were easily separable, the surface exposed to use in every case being soiled, compacted, and covered with fragments of egg-shell and a few uneaten remains of insects. Scattered conifer leaves between the layers, together with noticeable differences in the amount of winter-weathering, proved that the nests had been occupied during different years, not for two broods during the same season. If any one of these nests was used twice in one summer, no additional material was added preceding the second occupancy.

I cannot with certainty say that these nests were used in successive years by the same birds, but I believe this to be the case. Substantial evidence in support of this supposition was disclosed by a careful examination of the nests. Considering individually the entire fourteen, a distinct variation in materials was found: some contained exclusively one species of moss, others contained another kind only; some were strengthened with conifer needles, whereas the rest contained none of this material; in some, all materials were correspondingly coarser than in the others. In contrast, the nests which had been added to during second and third years were of uniform construction, the different sections containing the same kind and quality of materials.

Of the twenty-one broods of young represented by these fourteen nests, twelve were raised in nests used more than one year, and only nine in those used but once. Moreover, some of these latter nests would probably have been used a second time had they been left undisturbed. It seems certain, therefore, that this repeated use of a single nest is a normal habit of the species.

But little variation occurs in the general types of materials used in constructing the nests. In comparative bulk the average nest is composed approximately as follows: plant down, 60 per cent; tree lichens, 20 per cent; ground and rock mosses, 10

per cent; tree mosses, 5 per cent; spider webs and fibers of insect cocoons, 1 per cent; miscellaneous material, 4 per cent.

The "shell" of the nest is formed principally of ground and rock mosses mixed with more or less plant down, strongly bound together with cocoon fibers, especially at the rim. Many species of moss are utilized, but generally only one kind is used in an individual nest. In many cases black fibrous tree moss also is used. This part of the nest contains the "miscellaneous material". In the fourteen nests examined this included conifer needles, grass, aspen bark, rotted wood, feathers (from the birds themselves), small leaves, and pieces of spider and insect skeletons (Diptera, Coleoptera, and Hymenoptera).

The exterior of this framework is thickly covered with gray or greenish lichens of the kind occurring on the tree in which the nest is placed. The pieces are bound to the moss by shreds of insect webs and cocoons, or by fibrous tree moss. The main body of the nest, within the sustaining framework, is composed of a thick, soft layer of various kinds of plant down, firmly compacted to form the interior cup. This down retains its shape without being bound with any other material.

Second year additions to a nest are composed mainly of down. Often the only added material is a thick layer of

Fig. 12. WINTER VIEW OF A TYPICAL NESTING SITE OF THE CALLIOPE HUMMINGBIRD. THE NEST IS PLACED NEAR THE END OF A LOWER BRANCH OF A CONIFER, OVERHANGING THE WATER.

down in the bottom of the cup, and a thinner one on its sides. This method of addition decreases the depth of the cup about a quarter of an inch. In other cases, the rim of the nest is heightened also. If this is done, a new layer of lichen is added to the outside of the nest, making it impossible to determine, from the appearance of the exterior, how many years the nest has been used.

The average dimensions, in inches, of the fourteen nests measured are given in the following table.

Dimension	Minimum	Maximum	Average
Depth, upper side	.500	1.250	1.0
Depth, lower side	1.000	2.500	1.4
Width at top	1.625	2.000	1.8
Width at bottom	1.750	2.500	2.0
Width of cup	.875	1.250	.9
Depth of cup	.500	.875	.6

As all but one of these nests were collected after the young had grown and left, and five of them after they had been used more than one year, the average cup measurements may give a slightly greater width and lesser depth than the typical nest when first constructed. In the main, however, the dimensions were quite uniform. The width of the cup, before the young are hatched, is slightly greater at the center than at the top. The exterior depth is influenced by the method of support, being less in nests saddled on limbs than in those semi-pensile, and by the slope of the branch.

From these data the nest location and construction of the Calliope Hummingbird, at least in Lincoln County, Montana, may be described thus:

Nest: In the Canadian or Transition zone, placed near the end of a lower limb of a coniferous tree, usually overhanging a stream or at the edge of a forest opening. Compactly made of plant down, held in shape by a framework of green moss bound together by spider web and insect cocoon fibers; exterior protectingly colored with a thick layer of lichen scales.

Moccasin, Montana, February 23, 1926.

EYE SHINE IN BIRDS,
WITH NOTES ON THE FEEDING HABITS OF SOME GOATSUCKERS¹

By A. J. VAN ROSSEM

IN MOST PARTS of North America night hunting has been prohibited for obvious reasons, but in practically all parts of Latin America it is still almost universally practiced, for it is by far the most practical method of securing maximum results with the minimum of effort. I refer particularly to 'jack-lighting' or hunting by means of artificial light which causes the eyes of some animals to reflect the light and to appear to glow or shine. For purposes of study, or as an aid to the collection of specimens, night hunting plays an important part, yet, with a few notable exceptions, this fact has been virtually ignored by most field parties which have worked in regions where it is permitted.

During a recent collecting trip to Salvador for Mr. Donald R. Dickey, Mr. R. A. Stirton and the writer did a good deal of night hunting as an auxiliary to the regular routine. As a result, several species of birds and mammals were taken which were encountered only rarely or not at all in daytime work. More important still were the notes made on the activities of nocturnal species, a few of which are incorporated in the present paper.

We tried out both electric torches and also the type of carbide hunting lamp commonly used in that country, and the latter was found to be the more satisfactory for general use. Its chief advantage is that the light is mounted on the forehead, so that one's eyes are always looking directly along the beam. This is absolutely necessary for obtaining clear or distant reflections.

When first undertaking this sort of work, the assortment of green, white, and red eyes which are met with is apt to prove puzzling, but in a short time they become readily identifiable as insects, mammals, or birds, as the case may be. Eventually one comes to know almost to a certainty that the owner of a given eye or pair of eyes belongs to definite *species* of bird or mammal. I say "almost" because large spiders, moths, and occasional strayed domestic animals are apt once in a while to upset calculations.

The color of the glow from the eyes of nearly all birds which reflect light at all, is an intense, brilliant orange-red. The color of a live coal is a good comparison, although the intensity varies with the type and power of the light used. A partially exhausted battery, for instance, will result in a darker return glow. Under favorable circumstances and with a good light, a Whip-poor-will's eye can be seen for over 100 yards, and the eyes of Giant Goatsuckers and Thick-kneed Plovers for twice that distance.

The following is a condensed summary of the species of birds observed, or of which I can find mention, whose eyes reflect light. The authority for including each species is given in the footnotes below, where based on other than Stirton's or my own observations. In cases where no trinomial is used, the subspecific status has not yet been determined.

1. Brilliant orange-red, "glowing pink", or "dark red":
Oedipodus tristis
Oxyechus vociferus vociferus (not positively identified)
Strix varia alleni (1)
Nyctibius griseus (2 and 3)

¹ Contribution of the California Institute of Technology.

- Antrostomus vociferus*
Antrostomus carolinensis
Nyctidromus albicollis
Setopagis parvulus (4)
Phalaenoptilus nuttallii nuttallii (5 and 6) and *P. n. californicus* (6)
Chordeiles acutipennis texensis (6)
2. Pale dull green:
Chordeiles acutipennis texensis
3. Color not specified:
Struthio camelus (7)
Bubo virginianus pallescens (8)
Bubo virginianus (Salvador)
4. No reflection of any sort observed under the most favorable circumstances:
Strix occidentalis occidentalis (8)
Ciccaba virgata virgata
Otus cooperi
Otus asio gilmani (8)
Bubo virginianus pacificus
Glaucidium brazilianum ridgwayi
Cochlearius zeledoni
Heterocnus cabanisi
Nycticorax nycticorax naevius
Nyctanassa violacea
Casmerodius albus egretta
Butorides virescens
Phalacrocorax vigua
Anhinga anhinga

-
- (1) Wetmore, MS.
 (2) Beebe, *Jungle Peace*, 1918, p. 275.
 (3) Shiras, *National Geographic Magazine*, vol. 28, 1915, p. 179.
 (4) Wetmore, *Bull. 133, U. S. Nat. Mus.*, 1926, p. 204.
 (5) Bergtold, *Auk*, vol. 33, 1916, p. 81.
 (6) Huey, MS.
 (7) Wood, *Fundus Oculi of Birds*, 1917, p. 16.
 (8) Loye Miller, MS.

We had excellent opportunities to observe at night the species of owls listed as giving no reflections, and have had all of them sufficiently close to see the eyes only as round black spots. Therefore I was surprised to receive the information from Dr. Wetmore that he had noted a bright red reflection from *Strix varia alleni*. A horned owl seen by Mr. Stirton in Salvador, and one seen by Dr. Loye Miller in California, gave a bright reflection clearly visible at long shot-gun range, but the glow was of no particular color. In the former case, the bird apparently closed its eyes to avoid the glare, a thing which the other owls listed certainly did not do. The herons and cormorants which I have listed were also seen on numerous occasions, as we were coasting along lake shores at night. Most individuals permitted a reasonably close approach, sufficiently near to see that their eyes, like those of most owls, appeared as round black buttons with no reflection whatever.

The observations outlined above will, I think, hardly support Mr. Shiras' supposition (*loc. cit.*, pp. 178-179) that "... practically all those [animals in general] of nocturnal habits possess this element [tapetum] of the eye", and that "the possession of the tapetum is directly associated with night vision". Mr. Shiras' paper was, of course, written before Dr. Wood's splendid monograph appeared, showing that reflection from the eye of at least one species of bird (Nubian Ostrich) comes from an analogous specialization and not from a true tapetum. But aside from this mere technicality, the point I wish to emphasize is that it is difficult to credit *Strix varia* which glows bright red, with a keener night vision than *Strix occidentalis* and most other owls which do not reflect light at all; nor does it seem likely that Night Herons are any less perfectly endowed in this respect than the Thick-kneed Plovers. There

seems to be no correlation between the color of the fundus and the reflection of light, for that of *Cochlearius* is red as in *Caprimulgus*, *Oedipodius*, and *Strix*, while *Struthio* is dull red intermixed with gray (Wood, 1917). Nor is there seemingly any value for purposes of classification in the presence or absence of light-reflecting qualities in the eyes of birds, except that, as already noted by Mr. Shiras, apparently all of the goatsuckers are so gifted.

It was with this last mentioned group that our experience was most extensive, for every night excursion resulted in seeing from two or three to perhaps a hundred individuals. Because so common and so easily seen, *Nyctidromus albicollis* was more apt to be regularly met with than any of the other four species encountered in Salvador. These "pucuyos" have a most ludicrous habit of making vertical jumps when the light is turned on them, at the same time giving their characteristic gutturals and wails. We often saw them in flight in the early dusk, en route from their daytime forest hiding places to the feeding grounds. Any open area, such as a corn field or forest road, was the gathering place for all the "pucuyos" from the nearby jungle and in such places they would remain most of the night. I believe them to be ground feeders exclusively, and most of their food is probably procured by jumping and flopping. Their terrestrial habits are reflected in the long, strong legs and feet. Although we saw all told a total of several hundred, only one individual was seen perched off the ground. As the color, size and location of eyes are usually about the only clues to identity, we supposed this individual, which was perched on a bent-over corn stalk, was a Whip-poor-will, and only realized our mistake when it was collected.

Antrostomus vociferus is not a ground feeder in our experience, covering about twenty-five birds, nor were individuals ever discovered directly on the ground, even during the daytime. One was found dozing on a small oak branch half an inch thick which was lying on the ground beside some bushes; but with this exception every one was perched on a twig or branch at heights varying from a few inches to six feet. Their night or hunting stands were invariably at the edge of an open space and there was evidence that the same place was used night after night. We saw, on several consecutive evenings, Whip-poor-wills at the identical spots where first seen, and there was no reason to suspect them of being other than the same birds. The daytime perches often had sufficient excrement under them also to indicate a fixed roosting place. The eyes of this species seem to have the power of reflecting light even more brilliantly than those of *Nyctidromus*. We saw one on a stump in a corn field at a hundred paces, and the glow at that distance was plainly visible. This bird was characteristically tame and allowed me to approach within about 15 feet before taking flight. Once in the air it made every effort to outmaneuver the beam, for it was apparently strongly averse to leaving the locality, and for several minutes the glowing red eyes—sometimes one and sometimes two—whirled and zig-zagged and spiralled before coming to rest on a low dead branch in the bordering fringe of forest trees. If alarmed, Whip-poor-wills often faced us squarely, showing both eyes as if binocular vision was used, although ordinarily only one eye at a time is seen.

Chuck-will's-widows were rare and only two were found at night. One was on a four-foot fence post, at the edge of a cotton field; the other alternated between a fence post and a large horizontal branch twenty feet from the ground. This last bird was very active and made frequent short flights. Those flushed in the daytime were mostly well up in trees, and I suspect that they habitually hunt higher than Whip-poor-wills do.

Although Giant Goatsuckers (*Nyctibius*) were not particularly rare, I did not personally meet with them when using a light at night. Mr. Stirton shot one for me, from the top of a fifteen-foot dead stub in an open grass pasture. Its eyes were like

those of the smaller goatsuckers in color, but showed very much larger and they were first seen a long distance away. This individual appeared to use binocular vision at times. Our native hunter shot two from "very high" in trees at night, and one from a fence post. He located all of them by their eyes. I saw them flying in the dusk on several occasions. The flight is heavy and owl-like, and much less erratic than that of the smaller goatsuckers. Their food is correspondingly large, consisting of big beetles and moths.

The Texas Nighthawks were more varied in feeding habits than any of the others. During the winter they were very common in favorable lowland localities, and shortly after sundown would appear in hundreds, flying high and toward the sunset. A little later in the short interval of dusk, they flew much lower and the general direction was opposite to that taken at first. We supposed them to be working back to the localities from which they first started, feeding as they went. It was some time before we found out anything of their nocturnal activities, for their eyes gave only a pale green reflection, which was easily overlooked and not visible beyond a few feet. Many spiders gave a much brighter glow than these nighthawks, and only by careful search in suitable places, could we find them. All the individuals which we found after dark were on the ground in the open. *Chordeiles acutipennis* therefore hunts through three air levels, high in the air at sundown, closer to the ground at dusk, and on the ground after dark. Because of this versatility, its food must necessarily be more varied, and, because obtained from three strata of insect life instead of one or two, must be more regularly plentiful. It is not surprising, then, that in point of numbers and of geographic area occupied it is a more "successful" species than others which hunt in comparatively restricted life-zones.

Mr. Laurence Huey tells me that when out with an electric flashlight, working his mammal trap-line at night, he has seen Texas Nighthawks' eyes on many occasions, and that they shone red and were indistinguishable from those of Nuttall and California poor-wills. These facts suggest a seasonal change, possibly correlated with sexual activity; for Mr. Huey's birds were seen during the spring and summer months, while those noted by Mr. Stirton and myself were all seen during December and January. I may add that in both cases the observations cover the same subspecies (*texensis*).

Very little is known of the activities of nocturnal birds and other animals, and I suggest that occasional observations along the lines indicated above would profitably supplement the usual methods of daytime nature study.

Pasadena, California, October 27, 1926.

BREEDING BIRDS OF SCAMMONS LAGOON, LOWER CALIFORNIA

WITH EIGHTEEN ILLUSTRATIONS

By GRIFFING BANCROFT

NEAR THE CENTER of the Peninsula of Lower California, on its Pacific side and just below the point on Vizcaino Bay where the San Ignacio subfaunal district ends, there are a number of salt water inlets commonly called lagoons. These lagoons are seventy miles or more to the east of the regular coast-wise trade routes and so have rarely been visited by other than occasional fishermen in search of turtles or salt. The entrances are blocked by bars. These lagoons are becoming shallower as the sand drifts in, and the change is sufficiently rapid to be noticeable from one decade to the next. Within the memory of many men now fishing, all but one of these lagoons have practically become closed to power boats and even that one, Scammons, has become decidedly dangerous to enter or navigate.



Fig. 13. BREWSTER SNOWY EGRETS, AND THE MARSH AT SCAMMONS LAGOON, LOWER CALIFORNIA, MAY 24, 1926.

Wright M. Pierce, photo.

Scammons Lagoon is approached over a wide bar, followed by a run of eight miles between two lines of breakers that mark the channel. The bay itself is about ten by forty miles, running inland in an easterly direction. There are two main channels having a good depth of water, and there are islands, tidal islands, and many blind channels. The shore line is somewhat varied. By far its greater part borders a flat, gently rising desert with a sparse growth of "sage". There are a few low sand-hills, presumably blown up by the wind, and at least one line of earthen cliffs of twenty to thirty feet height. There are areas of high sand-dunes that are shifting and support no form of life. Conversely, a small portion of the mainland tidal flats, in protected spots here and there, is covered quite heavily with marine growths. A geologically recent ocean bottom surrounds the lagoon; and a wind as fierce and continual as any on the North Pacific Ocean blows only from the west. So we find the islands, which usually run north and south, to be little more than crescent shaped beaches

backed by slightly higher and almost level strands. Over them, sometimes nearly as thick as a fog, sand is carried a mile or more to the leeward where it builds up a shallow marshy country that has become heavily overgrown.

The greater part of the general area is covered with tall salt-water grasses somewhat related to the tules, though on the drier spots tiny fields of salicornia have taken hold. There are about six non-tidal islands of this nature. There is one island, presumably blown up by the wind; it is about ten miles long and a hundred or more feet in height, covered lightly with the characteristic "sage" of the country. This we did not visit, partly for lack of time and partly because any land birds we might find breeding there would only technically belong among the birds of Scammons. The surrounding country is a desert, almost flat, and barren save for a stunted growth of scattered bushes. There is no fresh water; there is no human nor domesticated life. Such is Scammons—dreary, inhospitable, forever battered by the crudest forces of nature.

With the coöperation of the San Diego Natural History Society and the two men it sent to prepare skins, together with Mr. Wright M. Pierce of Claremont, to whose skill I am indebted for all the accompanying photographs not otherwise accredited, and Mr. A. T. Kroeckel of Escondido, who volunteered to help the San Diego Zoological Society, I had the pleasure of spending the last few days of May of 1926 listing the breeding birds of Scammons. The San Diego Natural History Society has all the skins taken and has given me the fullest facilities of its staff in an endeavor to identify the birds we found. While this paper cannot make any attempt to analyze the status of the doubtful birds, nor to assign names, it does not seem advisable in all cases to follow without question the nomenclature generally assumed. As far as I am aware we were the first party of ornithologists to visit and report on Scammons. Our breeding records are nearly all of birds not previously known to nest within several hundred miles of the lagoon. I give their occurrence as facts which I have personally observed, but the subspecific status, as indicated, is often a matter of conjecture.¹

WESTERN GULL

One of the birds we watched with special interest on our way south was the Western Gull. Taking into consideration knowledge gleaned on previous trips on the mainland, together with the skins we collected from island to island as far as San Geronimo, there seems to be no doubt that *Larus occidentalis wymani* extends coastwise south at least to Point Rosarito, the beginning of the San Ignacio sub-faunal district.

In the lagoons we might logically have found either the northern *Larus occidentalis wymani*, or *L. o. livens* extending northward from Cape San Lucas, or an intergrade between the two, or even possibly a new race from the western shores of Baja California del Sud. As a matter of fact the skins we took were pronounced by the staff of the San Diego Natural History Society to be *L. o. wymani*, and there is much to justify that opinion. In breeding, the gulls in Scammons showed a tendency to seek the higher spots, they confined themselves to a few islands, they laid occasionally in isolated groups of a pair or two, and they built very unsubstantial nests. They did not particularly seek for the inconsequential protection offered on the islands. Their breeding season is from the middle of May—whether onward or not it were hard to say; for the later layings may be due to repeated thefts of the earlier. Of course the nests vary greatly, but the one illustrated herewith is quite typical. The legs of the

¹ NOTE.—The purpose of this paper is to record the facts discovered in Scammons Lagoon. The editor of THE CONDOR is not to be held responsible for the conclusions drawn from those facts.—Author.

birds showed none of the characteristic yellow of the Gulf gulls; in fact, at least so far, we have no evidence that the birds are not pure *wymani*, except for the length of the egg shells.

The value of egg dimensions depends almost entirely on the proper application of the rules of mensuration. The differences between averages are small when compared with the marked variation of individual sizes within a series. So it is necessary not only that the instruments be handled by an expert but that sufficient material be used. It is also highly desirable in comparative work that the measuring be done by the same individual because the personal equation is very pronounced. So far, generally speaking, the precautions taken have not been sufficient to justify ornithologists in giving to oological dimensions the consideration I believe they deserve.

I have checked my own work with much care and I am convinced that average egg sizes, if carefully obtained, constitute one of the important factors in analyzing bird



Fig. 14. NEST AND EGGS OF WESTERN GULL (subspecies ?) AT SCAMMONS, MAY 23, 1926.

Wright M. Pierce, photo.

life. I have had experience with instruments of precision and find, by re-measuring, that I can maintain an accuracy to the closest fiftieth of an inch. Where I have the material available I keep on adding measurements until my averages are almost constant, and I do not believe their error will then exceed one one-hundredth of an inch. With the personal equation eliminated I feel safe in using figures as a basis from which to draw positive conclusions. The conclusion in the case before us is that the gulls in Scammons are not the same as the birds which breed off the coast of southern California. That belief is based on the following figures, in inches, all from eggs personally taken and measured.

Todos Santos and Los Coronados Islands,	50 eggs	2.78 x 1.95
Scammons Lagoon,	50 eggs	2.89 x 1.98
San Luis Island,	30 eggs	2.89 x 1.99

It is much easier to detect the adulteration shown here in size than to locate its source. It cannot come from the north, as the ranges of *L. occidentalis wymani* on the American shores and on the western side of the Vizcaino Desert subfaunal district to its southern extremity have been thoroughly worked out and are understood. I think it equally safe to say that it does not come from the near-by Gulf of California. Certainly it does not do so directly. It is only in the sizes of their respective eggs that there can be found any similarity between the birds of the two seas.

The nests of the Gulf gulls are bulky affairs, many two or three feet long, built to a thickness of several inches with fibrous sea weed. They are not placed on the plateaus of the islands but rather among the boulders or against the bottoms of cliffs near the waters' edge. If there were any intergradation with *wymani* in the Gulf or with *livens* in the Pacific it would become apparent where instincts oppose each other as strongly as in these two races. For the nests of Scammons, as I found and described them, are pure *wymani*. This, too, in spite of the fact that there are places where the peninsula is scarcely fifty miles across, and a bird at moderate height could actually see into waters thickly populated with gulls of the other race. Crossing from one shore to the other either is not done, or is so rare as to have no influence. I have carefully studied the legs of both *livens* and *wymani*, and neither I nor any of the trained observers with me have ever seen either outside of its proper range.

With the gulls of the Gulf clearly out of contact we are thrown back on southern influences to account for the size of the eggs in Scammons. Only a thorough survey of the western shore of Baja California del Sud can give a trustworthy answer, for as yet we do not even know whether *livens* and *wymani* are distinct species. They may intergrade into each other farther south, or a distinct race may lie between San Geronimo and Cape San Lucas.

CASPIAN TERN

This bird as a salt-water breeder in the Californias is so far known only from San Francisco Bay and from Scammons Lagoon. In the latter place it nests usually in company with the Royal Tern, with this noteworthy exception, that while the colonies touch each other they do not intermingle. The Caspian builds a nest at least as pretentious as that of the gull. The one illustrated herewith contains the only set of three eggs which we found. The photograph was taken during such a heavy wind that a large part of the egg cavity was filled with drifting sand while the camera was being adjusted. San Francisco Bay throws no new light on this subject because local conditions there give the birds no opportunity for natural expression.

Through a misunderstanding we brought home no skins of this bird and have to fall back upon our eggs for identification. However, there is a very decided difference in texture, shape, and marking between the eggs of the Caspian and the Royal. This is apparent even in photographs. The normal complement of *Sterna caspia*, as we found it, is two eggs, and the bird will breed occasionally in isolated pairs, something *maxima* never does. To these differences we must add the all important factor that one always builds a nest while the other lays on sand without so much as scratching a cavity.

The Caspian Terns were not at all common. We made no effort to estimate their numbers in the air, but we found only a score or so of occupied nests. From reports from other sources they must be a very rare bird between Cape San Lucas and the vicinity of San Francisco. The nesting date is apparently early in June in normal years—rather later than with the Royals. We found only three small colonies.

What little data we have from the west points toward the possibility of there being more than one form of Caspian in North America. After writing my notes I

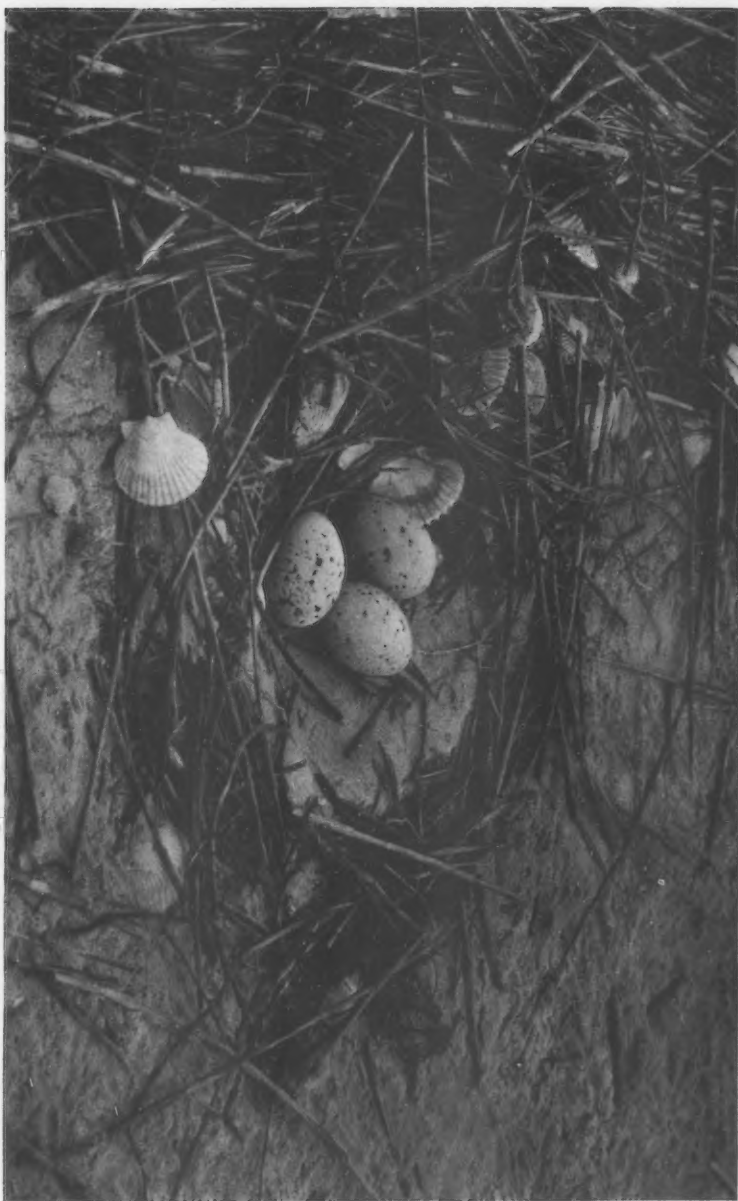


FIG. 15. NEST AND EGGS OF CASPIAN TERN; SCAMMONS LAGOON, MAY 24, 1926.

Wright M. Pierce, photo.

turned to Dawson's *Birds of California* and found that in our remarks on these birds we hardly had a fact in common. Mr. Bent gives the breeding range as "west to central California", which is correct as far as it goes; and Mr. Dawson, while giving some fresh-water records near-by, declares the bird does not nest in California. It is strange that near the Atlantic Ocean and in the Gulf of Mexico the Caspian Tern is a wide-spread breeder showing an apparent preference for salt water, while in the west ours is the first printed record of its breeding in the Pacific at all, though large numbers are known from places at no great distance inland. Their nesting habits over the continent as a whole are so contradictory as to deserve a special analysis.

Our discoveries in Scammons merely introduce one new factor. I could not procure enough eggs to do more than convince myself that the average size of Scammons-taken eggs is appreciably larger than is the general average elsewhere. It must not be forgotten that all we have actually proven is that these are not the Royal Tern.

ROYAL TERN

I must admit a feeling of real elation when I discovered an active tern colony on one of the islands. The spiral of flying birds and the chorus of angry cries are the means by which these gentle creatures protect their own. The white cloud was like a flattened whirlwind and brought a touch of action to a scene otherwise too drab and peaceful. When the terns were identified as Royal I was among old friends. I knew them to be breeders on San Roque and a number of islands to the south as well as in half a dozen places on the Gulf, but this is the first record among the lagoons of Vizcaino Bay.

In March of 1926, lying in the lee of George Island in northwestern Sonora, I watched Royal Terns for several days while they were trying to establish their colony. Getting started is a serious problem, for the eggs on the outer fringe are very easily taken by the gulls, there *Larus heermanni*. When we arrived at George Island the terns had not begun to lay, but during the first night they deposited seventeen eggs. Not expecting to remain, we took these. The second night the birds moved to another corner of the island. After they had laid some twenty eggs there came a heavy non-seasonal rain. So the third morning found them back at their original haunt. There were twenty-three eggs when we left, and probably a few of these survived the day. Indeed it is possible that from that time on the colony began to lay them faster than they were lost. Even yet all was not plain sailing. On April 22 of the year before (1925) I had found this colony on the same spot. At one end of the egg field at that time a few young had just hatched and many eggs were pipping. At the other end birds were still laying. One could trace, by the state of incubation through the colony, something of the long series of tragedies that had taken place. The terns seem so helpless against the gulls from the time the egg is laid until the babies are well grown, that one wonders how a bird that lays but one egg can hold its own.

When the young hatch, instead of remaining in the nest they gather into a small flock. To all appearances they are fed and protected by the parents as a communal institution. But before this is accepted as the correct diagnosis of their nursery habits, attention should be paid to pigmentation. I have slept more than once beside a Royal Tern colony and studied their lives from my blankets at a distance of a few feet. These terns, on their eggs, are very nervous. Every little while a large proportion if not the whole colony will take wing, fly about screaming for a moment, and then settle down again to incubate. I was able to work out regarding some of the indi-

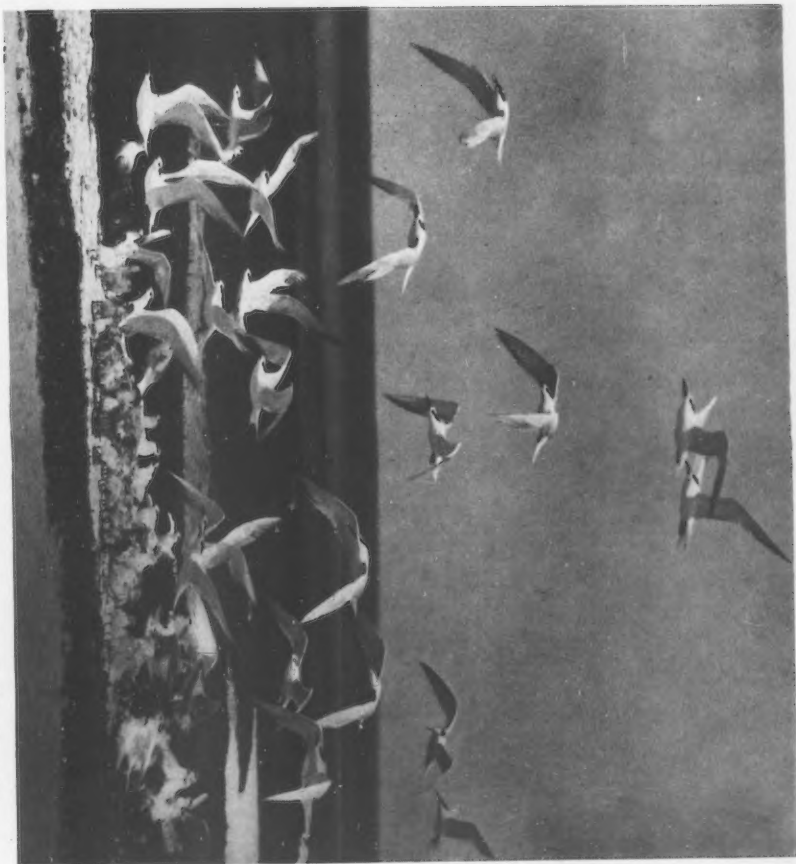


FIG. 16. ROYAL TERNS GUARDING THEIR YOUNG; SCAMMONS, MAY 23, 1926.
Wright M. Pierce, copyrighted photo.

vidual birds that each always returned to the eggs she had left. Indeed, the settling process was so rapid and so lacking in confusion that every bird must have been searching for her particular nest.

I presume, therefore, that one of the factors that make for safety, for rapid return, is that the variations in the color of the eggs quickens recognition. Pigmentation, however, goes farther than this. The downy young vary in color even more than the eggs. This is in face of the fact that throughout the bird world in general chicks just hatched resemble each other, species by species, almost to the point of being facsimiles. Since Madam Nature is not given to wanton vagaries, the only conclusion I can draw is that each parent seeks out and feeds her own young. Of course it may be that the community theory is correct—it certainly appears to be when one watches a huddle of young constantly surrounded by a swirl of flying protectors. I offer the other suggestion merely as my personal belief.

The nesting period of these terns varies with different colonies, even on the same islands. My Gulf records show fresh eggs from May 20 to April 25; the latter date probably by no means marks the end. In Scammons I believe from early April until well into June would cover the laying time. I have not sufficient data on which to base an answer to the question of a second laying after the first has been raised. My opinion is that they raise but one brood. I often wonder how they do that well.

Mr. Dawson had a highly imaginary theory that since these birds do not nest in Pacific waters they must cross the continent, probably at some narrow point, and there mix with their kin in the Atlantic. If they did so we would expect to find the Royal Terns all of one subspecies. As it is, geographical isolation should produce a western form. Here egg measurements again come into play.

A. C. Bent, in Bulletin 113, United States National Museum: 54 eggs average 2.48×1.75 ; Scammons, 50 eggs average 2.53×1.75 ; Gulf, 50 eggs average 2.59×1.77 . I regard the last two sets of measurements of as much importance as any I have made. The eggs were personally taken as well as measured, and though the difference in size may seem small, it is very constant. The only conclusion I can draw from these figures is that there are two western forms, the larger of which is possibly peculiar to the Gulf. I quote a letter which, though disappointing, substantiates this reasoning:

October 16, 1926.

My dear Bancroft:

You will be interested in knowing that we do not (at present) believe that the Royal Tern of Lower California is sufficiently differentiated to be formally named. Comparison with eastern specimens shows an average size difference of about five per cent (5%) in favor of the western bird, but even this difference is not at all constant and only a very small proportion of birds are, with reasonable certainty, to be distinguished. Possibly examination of a series of skeletons from the two areas will bring to light recognizable characters.

Sincerely,

A. J. VAN ROSSEM.

ELEGANT TERN

Half a dozen eggs of *Sterna elegans* were found intermingled with those of the Royal Tern. Of the six colonies of these terns I have visited, the two birds have always been together. The smaller clearly wait until the larger have laid and then, considerably greater in number, drop in among them to secure what protection they can. Neither species builds a nest, nor even so much as hollows out a site in the sand. When the parent of either comes up from the leeward she squats directly behind her eggs and pulls them underneath her with her bill. The breeding of the Elegant Tern in Scammons does not greatly enlarge its known range, for there are colonies on San

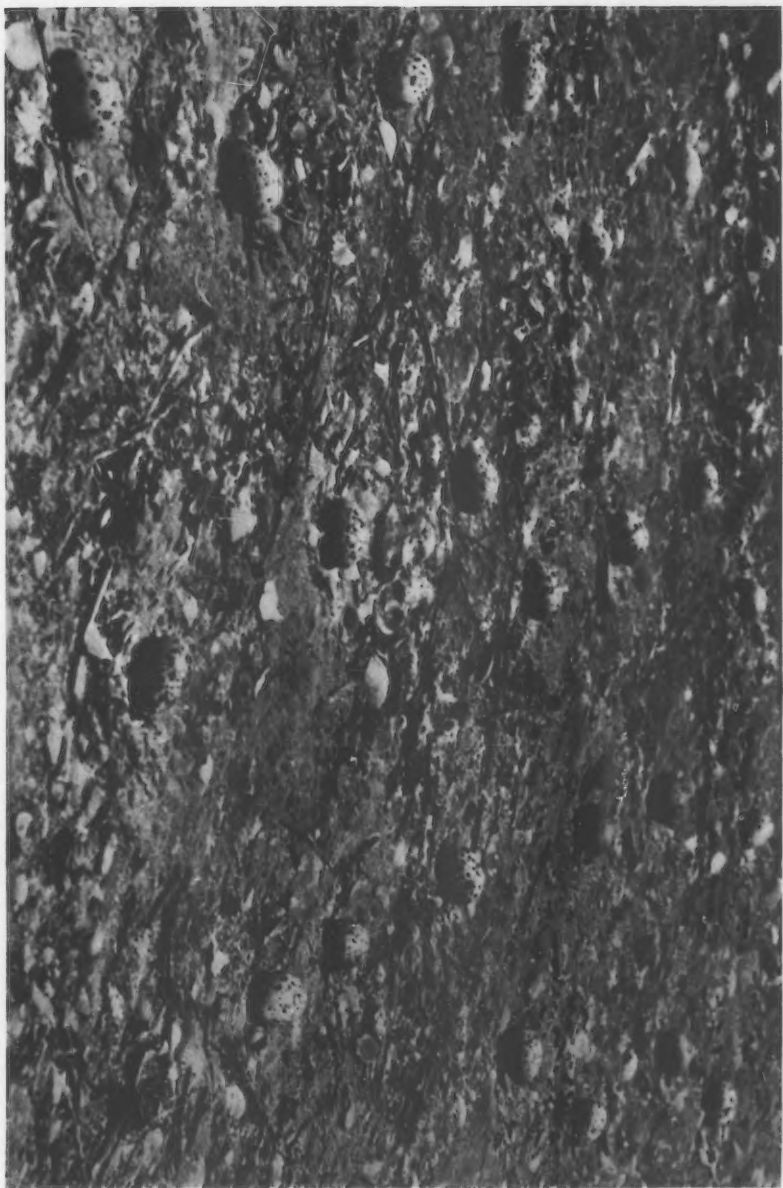


FIG. 17. EGGS, IN SITU, OF THE ROYAL TERN; SCAMMONS LAGOON, MAY 23, 1926.
Wright M. Pierce, photo.

Roque Island in the Pacific and on George Island and on Isla Raza in the Gulf. But it is a matter of interest to know that this tern does pass Point Eugenio and breed as far north as the lagoons of Vizcaino Bay.

We were too early for the regular laying of the birds, and however interesting their life history may be, it was not gleaned from information obtained in Scammons. The dates, as are so frequently the case, are here several months later than in the Gulf—laying beginning in March or April in one case, and in the other in June. The endless variation in egg markings is suggested in the illustration, though the colors do

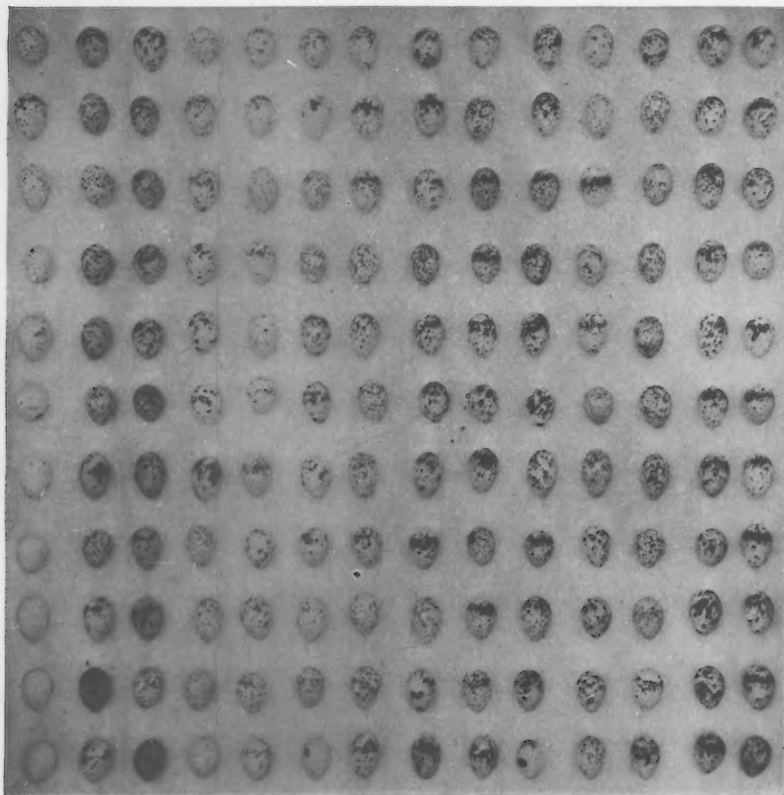


Fig. 18. CABINET SERIES OF THE EGGS OF THE ELEGANT TERN.

Photo by the author.

not show. The ground is blue, red, tan, white or slate, and the spots, scrawls and blotches include all of these except white and in addition black, which predominates.

BROWN LEAST TERN

The breeding colonies of these small terns occur at spots here and there down the coast from Monterey Bay. I have found them almost to the Mexican line but never south of it, though I see no reason why they are not to be expected there. Scammons

Lagoon now stands out as the most southerly record. We did not see the birds on this trip and my authority for listing them as breeders rests on a set of eggs brought me from Bird Island. This identification, however, meets the requirements of science, as there are no other eggs with which these can be confused and the collector is thoroughly reliable.

The subspecies *browni* has not been acted upon by the A. O. U. Committee. I have photographed a small series of eggs carefully selected as normal types. The three upper rows are from the east coast, therefore *Sterna antillarum antillarum*:

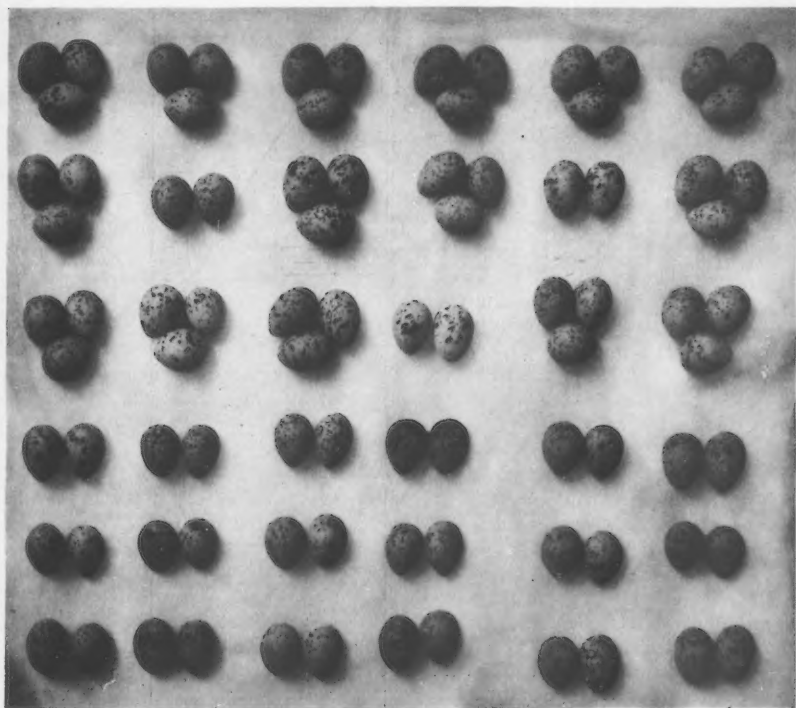


Fig. 19. CABINET SERIES OF THE EGGS OF THE LEAST TERN.

Photo by the author.

The rest are from San Diego County (except the set in the extreme right-hand corner, which is from Scammons), and therefore *S. a. browni*. I think the illustration tends strongly to prove *browni* to be a valid subspecies, because its eggs average decidedly darker in color and are almost without the usual brilliance shown in the other subspecies. Sets of three are common in the east, while with us two is the limit; at least three's are so rare that I still have my first of this number to find. The birds lay in Scammons about the middle of June. Personally taken measurements of nearly all the eggs in the illustration show those of both races to be remarkably near the same size, namely, 1.20 x .90 inches.

FARALLON CORMORANT

Farallon Cormorants (*Phalacrocorax auritus albociliatus*) are the only members of their family to breed here, but these ubiquitous birds have not neglected the lagoons of the San Ignacio District. However much out of place they may seem on level beaches, several small colonies are scattered through Scammons. In groups of from ten to thirty we found about eighty occupied nests. Most of these contained young which were not as uniformly developed as one would expect of such closely colonized breeders. So, if we assume the first week in April to be the height of their laying season, it is an approximation only.

The building materials used are coarse twigs. Even in such a place as Scammons, where sea grasses are abundant and roots and branches rare, this cormorant will make no compromise with its instinctive desire for coarse sticks and ventilated and almost unlined nests. The soft sea weeds favored by *penicillatus* are strictly taboo; instead we have a structure of the roughest nature, with neither matting nor lining in the cup.

GREAT BLUE HERON

Our acquaintance with this bird in Scammons is confined to one adult which was seen at a distance, and to five young which we brought home and gave to the San Diego Zoo. The fledglings were all but ready to fly, which would throw the laying date back into March. The parent birds were so shy that we did not even see them; they probably deserted their families as soon as we set foot on their island.

There were three used nests in the bushes shown in the central background of the picture of the Brewster Snowy Egret. These structures were so large and deep that I suspect the old birds of repairing and adding to them as the families grew. Whether they represented two broods of the current year already flown or whether they were left-overs from a former year we have no way of determining. The building materials were chiefly sticks as coarse as could be found. No attempt at lining was made, except to place some smaller twigs in the center.

We can make no intelligent guess as to subspecies here. Perhaps when the young reach maturity they will determine the matter for us. They might possibly be the Californian race, *Ardea herodias hyperonca*, though a bird of the San Diegan District is hardly to be expected here. More likely the San Ignacio District will be found to extend south to Magdalena Bay, in which case we might assume them to be the Espiritu Santo Heron, *A. h. sanctilucae*. There is always to be considered the unidentified form from the San Luis Islands in the gulf directly opposite. The individuals in Scammons resembled these closely in their nesting habits and unbelievable shyness. That introduces the possibility of a new bird, or of *A. h. treganzai*. They may be the same form as the birds which used to nest on San Martin Island, or even as the stray I saw on Todos Santos Island in April, 1924. Altogether it appears there is much to be learned on the distribution of the races of *Ardea herodias* in Lower California.

BREWSTER SNOWY EGRET

The nests of these birds were confined to the marshes behind two of the islands. The colonies in both cases were fairly compact and tended strongly to occupy the higher ground where the grass was rank and the overflow negligible. Perhaps half of all the nests within the area they pre-empted belonged to these egrets; the others being those of four genera of herons, as well as the reddish egret and the rail. Late May and early June appear to be the normal time for them to lay. Nearly all the sets we found were fresh or slightly incubated, but 1926 was apparently an early season for all western birds.



FIG. 20. NEST AND EGGS OF THE BREWSTER SNOWY EGRET; SCAMMONS LAGOON, MAY 24, 1926.
Wright M. Pierce, photo.

We experienced a great deal of difficulty in identifying the nests of these egrets, especially where the Louisiana Heron bred with them. By concealing ourselves and waiting patiently, usually less than half an hour, the parents would return. The Night Herons came first, then the Louisiana, and last the Brewster Snowy Egret, *Egretta thula brewsteri*. The birds of the latter species were considerably disturbed by our presence, but at the same time could not bear to leave their eggs exposed to the gulls. They seldom flew directly to their nests; instead, after circling around several times, they dropped into the marsh at a little distance and walked the rest of the way. Then they stood on guard for quite a while. When they did settle down to incubate, they were hidden from view except from above, as were all the marsh nesters.

The sets were usually of three or four eggs, with an occasional five. The building material was largely the stalks of the marsh grasses, with whatever fine dead twigs or roots the birds could find. The size in the accompanying photograph is very typical, though the nest appears to be much thicker than it really is. It is not very flexible and is supported from below by resting on the grasses. There is neither pretense of a foundation nor of any attempt to tie up to the tules.

When the San Diego Natural History Society identified the egret in Scammons as the Brewster, we cut in half the great stretch where it was unknown. *Egretta thula* breeds in the Delta of the Colorado; I have often been told so by aigrette hunters and have seen an immature as a pet running around a farm yard. It does not require any more stretch of the imagination to connect the bird of the Delta with the bird of Scammons than to assume the latter to be the same as those common near La Paz. Now if my reasoning be correct, no *thula* north of the Delta can be anything but *E. t. brewsteri*. Those I have found breeding in the San Joaquin Valley and those from the Great Salt Lake Basin are pocketed and isolated from any Atlantic forms. It is true that *brewsteri*, within the United States, may break into two forms, for some of the geographical isolations are vast. But I believe it demonstrated that *Egretta thula thula* does not occur in the Western United States.

I have measured forty Florida eggs in my collection and compared them with the same number from Scammons: Florida, average 1.74×1.30 ; Scammons, average 1.77×1.32 .

REDDISH EGRET

Adjacent to the Pacific Ocean the Lower California Reddish Egret (*Dichromassa rufescens dickeyi*) does not breed north of the San Ignacio District. On the Gulf side of the Peninsula there is a small colony on San Luis Island and on one other island of the archipelago. The bird is not reported from California and Arizona, but I have good reason to believe it nests in the Delta region—in which case it probably has visited both states, though unfortunately not observed.

The colonies in Scammons and on San Luis show nesting instincts distinct from each other, though whether this is a matter of adaptability or of isolation requires more information to determine. The nesting sites of the Gulf birds, for instance, are in a thick head-high form of salicornia. As far as possible, when building, the Gulf birds force their way into the brush for the protection and concealment it offers. They seek some height and the nests are rarely placed less than four feet from the ground. In Scammons they are rather indifferent about the location chosen. Some of their nests are out in the marsh, more are on the open beaches, while not a few lie along the border between the grass and the sand, especially where there is a bank a foot or more high. They colonize much more than do the birds on the Gulf. A few rebuild cormorant nests, but most place their flat structures of long fine twigs directly upon the ground. The Scammons birds show no preference for what little salicornia there is.

The breeding dates are not easily ascertained, because of the depredations of the gulls and because the season is so long. The season in 1926 was early among all our breeding birds. While on the western shores of the Peninsula during the last days of May there was an occasional nestling (none a week old), we usually found nearly fresh eggs or incomplete sets and drew the conclusion that early June is the normal laying time. It is interesting to compare this date with San Luis Island, not much more than a hundred miles to the north. There the breeding season is almost three months earlier.



Fig. 21. PART OF A SMALL COLONY OF THE LOWER CALIFORNIA REDDISH EGRET; SCAMMONS, MAY 23, 1926.

Wright M. Pierce, photo.

It has been said that *D. r. dickeyi* does not occur in the white phase. I cannot disprove that belief, but came very near it when I found a variegated bird sitting in an egret colony. With the exception of the barest tinge, all her normally red feathers were pure white and the others had less than half their usual brilliancy.

The eggs of these birds are much larger than those of the eastern race:

Scammons Lagoon:	1.96 x 1.49
San Luis Islands:	1.96 x 1.43
Eastern eggs in San Diego collections:	1.82 x 1.34

LOUISIANA HERON

This heron in Scammons is a marsh breeder. Its light, flattened nest rides on living grass with the higher tides often flowing beneath. Well out from shore, frequently as far as is safe to build, it makes its home. It seems to show a stronger preference for the edges of small pools and little drainage streams than for the proximity of other birds of its own kind. Quite a few do lay close to the sand-dunes, where they are surrounded with egrets and different herons; but this companionship, I think, is more a matter of accident than of design.

The nests of *Hydranassa* are almost indistinguishable from those of the Brewster Egret and the Yellow-crowned Night Heron. I have noticed all through the Ardeidae



Fig. 22. NEST AND EGGS OF LOUISIANA HERON; SCAMMONS LAGOON, MAY 24, 1926.
Wright M. Pierce, photo.

a tendency on the part of the birds to make free with the homes of others of the family, and I believe that one reason why the nests of these various birds in Scammons are so nearly alike is because occasionally more than one pair have had a hand in the building. Then, too, the choice of material is limited.

It has been assumed since the days of Brewster that this species nests along the west coast of Lower California, but as far as I know the present is the first published record of their so doing. I feel that my familiarity with the coast line warrants the statement that the San Ignacio lagoons mark the northern limit of their breeding range. I might go farther and add that no herons nest on the Pacific side of the Vizcaino Desert nor in the San Diegan District south of a small colony of the California Blue Heron ten miles from Tijuana.

The heron we are discussing is one of the latest to breed. Ordinarily I would expect it to begin about the first week of June. Usually three eggs are laid, but fours are not unusual. Many nests contain but two, and once in a while a five is found. The birds are not at all common in Scammons; there are probably not over seventy-five pairs.

In naming this bird, or rather in carefully abstaining from so doing, I have taken into consideration the fact that if it is a bird of the western coast only, it should not bear the name of Louisiana at all. The evidence pointing toward a new subspecies



Fig. 23. NEST AND EGGS OF THE BLACK-CROWNED NIGHT HERON;
SCAMMONS, MAY 24, 1926.

Wright M. Pierce, photo.

here is largely a matter of following the history of other water birds. One by one those common to both coasts have been subspecifically separated because isolation has endured so long that real differences have developed. Sometimes the distinctions are so deeply hidden that it has taken much time and patience to define them. Almost uniformly, between similar birds of the Pacific Coast on the one hand and the Gulf of Mexico and the Atlantic Ocean on the other, the western eggs are larger, and those of *Hydranassa* are exceptionally so, as follows:

Average from Scammons Lagoon:	1.83 x 1.56
Average of eastern eggs in San Diego collections:	1.73 x 1.27

The line of reasoning that shows that it is virtually impossible for this bird to be *Hydranassa tricolor ruficollis* is the same as will be used a few paragraphs below in dealing with the Yellow-crowned Night Heron.

BLACK-CROWNED NIGHT HERON

In the photograph of the Brewster Snowy Egret reproduced in this article some bushes can be seen on the beach. These are the favorite though by no means the exclusive breeding sites chosen by the Black-crowned Night Heron. The nests are not placed on the top of the brush but rather on the sides, half way up or less. There is nothing to suggest any attempt at concealment, nor a persistent tendency to colonize closely. A dozen nests may be within a radius of a few yards, while on the other hand one is apt to find scattered or isolated pairs almost anywhere, particularly in the marshes. There, however, they have a marked tendency to crowd close to the sand dunes. The number of this species breeding in Scammons is not large; a hundred pairs would include them all, to the best of my judgment. They probably commence laying about the middle of April. They are the least shy and decidedly the most nocturnal of the herons.

The photograph of the eggs and the nest presented herewith is so characteristic that a careful examination will tell the details of construction. The building material is in sharp contrast with that of the other herons, although much finer than the Farallon Cormorant selects. There is very little variation from the type illustrated, so little, in fact, that this was the one heron we were content to identify by its nest. These are the most northerly breeding grounds of this bird on the Pacific side of Lower California.

The dates of nesting are very irregular. I believe at Scammons the birds lay from the middle of March to the middle of June. Half-grown young to fresh eggs showed the variations of individuals. The most valuable feature of the discovery of this heron nesting in Scammons was the connecting of probable breeding ranges south to Cape San Lucas and thence north through the San Luis Islands and the Delta up the California valleys. There was nothing either in the breeding habits or in a careful comparison of Scammons eggs with a series taken near Los Baños to suggest any differences between the Mexican and the San Joaquin birds. The subspecific status of these Night Herons is a California problem.

YELLOW-CROWNED NIGHT HERON

This is the rarest of the larger breeding water birds we found in Scammons. Our take was limited to a single set, though there were many breeders that kept well out in the marshes away from the bedlam on the beach and in relatively deep water. The birds were so shy that when we did flush them it was hard to tell with any certainty which nest, if any, they came from, and furthermore every indication pointed to our being much too early for them. The occupied nest we found, and all other nests which might have belonged to this bird, was so like those of the Louisiana Heron and the Brewster Egret that we were unable to distinguish the three. The importance of this fact lies in the psychological difference between the Black-crowned and the Yellow-crowned night herons. The former, driven by powerful instincts and in the face of considerable difficulty in finding materials, determinedly builds with thick twigs or small branches. The latter, in Scammons, uses dry roots and grasses and fine twigs. A comparison of the two accompanying photographs readily shows the difference.

The finding of these birds laying in Scammons and on the San Luis Islands marks the northern line of records for the west coast. They have not been reported so far from either California or Arizona, and while that negative evidence is not conclusive,

it does show that San Luis and Scammons are, with the exception of the unknown possibilities of the Delta, their most northerly outpost. Of course they may and probably do wander to the river flats, and perhaps they breed there in numbers along the southern tip. Strays are to be expected at any time north of the international boundary line. But for all practical purposes it may be assumed that the northerly normal range of this heron is confined on the west to Mexico.

There is no attempt here to prove the existence of a western race to replace in Pacific waters the Yellow-crowned Night Heron of the Atlantic. But the extreme probability of such a condition is shown by the analogy of almost every water bird that is resident in the Pacific Ocean and whose contact with eastern races has been



Fig. 24. NEST AND EGGS OF THE YELLOW-CROWNED NIGHT HERON;
SCAMMONS, MAY 24, 1926.

Wright M. Pierce, photo.

broken by the Rocky Mountains. The nesting habits of the true Louisiana Heron show psychological differentiations which one would naturally expect to be paralleled with physical differences. Certainly it does seem that these facts at least require the assumption that separate races of both *Hydranassa* and *Nyctinassa* are represented in Scammons Lagoon, unless strong proof to the contrary can be obtained.

RAIL

I had known for several years from my fisher friends that a *Rallus* breeds in Scammons. Accepted authorities extended *R. levipes* south to San Quintin, while from the south *R. beldingi* was recognized as far as Magdalena. My interest in knowing what was breeding half way between was keen enough to be the principal

motive that took me to Scammons. We were fortunate enough to secure four adults, which the staff of the San Diego Natural History Society has identified for me to be *Rallus beldingi*.

There is a chain of bays and inlets along the coast to Magdalena and there are many reasons for believing that rails breed in all of them. None are so widely spaced as to isolate the birds of one lagoon from the next, and therefore it would seem quite logical to suppose that one species might occur in them all. In Lower California there is remarkably little north and south change as compared with California itself. On the other hand there is a vital point to be taken into consideration, namely, Scammons



Fig. 25. NEST AND EGGS OF THE RAIL OF SCAMMONS LAGOON; MAY 24, 1926.

Wright M. Pierce, photo.

is the most southerly of the lagoons that are free from mangroves, and it is hardly safe to assume that this rail is not new, as he lives neither in the mangroves nor in the Vizcaino Desert subfaunal area. It is beyond the province of this paper to go into the study of skins, so I will confine myself to the statement that the Rail in Scammons is neither the Belding nor the Light-footed, nor intergraded with either, but a new and separate species.

I found four occupied nests. The first contained three eggs which we could not save, as they had been abandoned when the mother left with her brood. This nest was over water a foot or more deep and was fastened to the heavy marsh grass. It

was quite large, of the semi-floating type, similar to the third nest, which we photographed. The second set was well up on dry ground, slightly protected by dead grass and by an osprey nest near-by. It contained two eggs, an incomplete set, with one egg hardly half normal size. The fourth nest contained five babies just hatching. The mother flushed scarcely a yard from my feet. She had built in short salicornia much after the manner of the meadowlark, and thirty feet from the water. All the nests were on one island, though we did see signs of the birds breeding elsewhere. These notes comprise our full knowledge of the breeding habits of these birds.

We cannot do much toward distinguishing the eggs of this rail from those of other species without the aid of a larger series than anyone has hopes of obtaining. When first found, we all noticed a peculiar pink flush on the surface of the shell, but that already has largely disappeared. The set of seven averaged 1.79×1.19 inches. The downy young were a lustrous jet black, their feet the same color, and their bills partly yellow. Excluding one runt, the other four averaged 3.6 inches in length.

BELDING WILSON PLOVER

Mr. H. H. Bailey in his *Birds of Florida* comments on the fact that the Wilson Plover will lay only among the colonizing Least Terns. So strong is this predilection that the plovers adapt themselves to the marked variation in the nesting dates chosen by their hosts. This is not a universal habit of the Wilson; but, as there are benefits derived in the southeastern United States by protection from raids of the gulls, it is easy to understand that advantages would accrue in Scammons Lagoon. More insistent and pilfering birds than the gulls of the San Ignacio District it would, indeed, be hard to find.

In any event, in the closing days of May, 1926, the Brown Least Tern had not appeared nor had the Belding Plover (*Pagolla wilsonia beldingi*) commenced to lay. The breeding grounds of the latter had been chosen and the nesting cavities excavated. Hours of diligent search were rewarded only by a broken egg-shell, but this makes Scammons the most northerly breeding ground of record. True, the bird does wander as far as San Diego County, where Mr. A. M. Ingersoll was alert enough to take a specimen in 1894, and there are many as yet unvisited beaches along the shores of the San Diegan and Vizcaino Desert districts. On the other hand, it may be more than a coincidence that this plover breeds in the extreme northern tip of the San Ignacio District and has not been found past it.

The egg taken was readily identified by several oologists to whom I showed it. We saw no other birds whose eggs could in any way be confused with these, and the record stands without qualification. The islands on which these plovers congregated were not inhabited by any of the other birds we have discussed. The plovers preferred dust and soft dry sand and bushes and abhorred the marshes. Their nests were usually well back from the water.

SNOWY PLOVER

These little denizens of the beaches must lay about the last week of April in Scammons. We found many chicks on the great black flats when the tides were down—the cutest little things one could imagine. Only a few days old and feeding industriously a hundred yards from cover, one wondered how they could escape the raven and the gull. A watchful parent might warn them, but even so, there was no place to hide. However, ravens were scarce and the plovers kept far away from the gull infested islands; and, as both babies and adults were plentiful, their scheme of life must have been successful.

We found no occupied nests and so can do little for ornithology beyond recording the fact that *Charadrius nivosus* does breed here, a long way from any place from



Fig. 26. NEST AND EGGS OF FRAZAR OYSTER-CATCHER; SCAMMONS, MAY 23, 1926.

Wright M. Pierce, photo.

which they have been reported before. But there is no reason why they should not occur plentifully both to the north and the south, and they probably do.

OYSTER-CATCHERS

Scammons Lagoon is a haven for oyster-catchers, or appears so to such of us as are accustomed to but an occasional pair scattered along the various islands and rocky projections in the more northerly Pacific Ocean. There are at least two or three hundred oyster-catchers fairly evenly distributed over the islands we visited, with an occasional pair or so on favorable mainland strands. When the tides are going down vast stretches of hard flats are exposed and become feeding grounds. The birds pursue the receding water even to the point of wading, and there they hunt the small marine life on which they live. When the tide turns they use the black levels as a lounging place until driven ashore by the sea. They are markedly indolent and slow in movement and, when undisturbed, never appear the least bit busy.

They climb up on the shell banks which are the back-stops of the beaches and there build their nests. The shall banks are usually a yard or two above high-water mark; they are flat and quite narrow and often have finger-like projections of fifty yards or so on the same level, running toward the east. Typically, all these higher flats are composed of nothing but shell, largely unbroken and of a size which may be judged in the accompanying illustration. Sand and small impurities have been garnered by the wind. The oyster-catcher likes to build her nest where she has an unobstructed view in all directions, securing to herself the opportunity of slipping off unobtrusively at the approach of an enemy. But she is a stupid bird and is easily satisfied with a make-shift which seems to her to accomplish her purpose, but in reality does not do so at all. So on some of the earthen islands we find her nesting on little mounds from which, it is true, she can see, but to only a matter of a few feet.

In the Gulf of California the favorite site for an oyster-catcher is the end of the rather long spits of cobble stones. These are so nearly level that a sitting bird has an unobstructed view for a hundred yards. There she builds a nest of fine hard material—small pebbles and bits of shell. And as she cannot have broken the larger stones that were originally on the site, she must have removed them. I use the analogy for Scammons. Instead of breaking the shells with her powerful bill she probably pulls them out of the way until she has a flat circle about ten inches across. This clearing she lines as neatly as tile work, and on them deposits her eggs, one, two, or three. The breeding season seems quite long, as we found both well developed young and fresh eggs. I have observed parents with their young long after the latter had taken wing and so feel sure that the oyster-catchers raise but one brood a year.

In trying to assign a name to these birds in Scammons I must confess that nothing I have read will fit the conditions I found. Ninety per cent of the oyster-catchers had white bellies, the rest had all their underparts black, with the exception of one whose belly was streaked black and white. Mr. Chester Lamb wrote me that on Natividad Island there was a much larger percentage of mixed underparts than we found. That there were two phases of one bird instead of two distinct species in the lagoon was apparent to anyone watching them. There was only one case I observed of a black bird paired with another black; all the other blacks had white-bellied mates. The difference between the birds was limited to the abdomens: place a mixed series in a row with the backs up and one could not tell one bird from the other. In their conduct, especially when their nests were threatened, there were no differences at all.

I feel perfectly safe in saying there were no Black Oyster-catchers (*Haematopus bachmani*) present. I have seen too many of them, from Monterey to Sitka, not to know by heart every movement they will make and every note they will utter when

one trespasses on their homesites. The actions and the cries, and especially the noise, are more unusual and more uniform than those of any bird with which I am acquainted. They fly customarily in a complete half circle from the rocks on one side to those on the other, the birds keeping near each other and almost always close to the water. The noise is incessant, shrill, continuous and loud beyond belief. The contrast with the birds in Scammons is striking. There, both the white and black bellied are almost as silent as plover and try to win safety by a prodigious show of indifference. There is little or no excitement while we tramp around the nesting sites. When the parents find we cannot be persuaded to follow them away they take up positions fifty to a hundred feet from us and there remain motionless, usually as long as we are in the neighborhood. There is another great difference between *H. bachmani* and the black phase in the south. The former is decidedly darker than the latter, especially on the back, whereas true *Haematopus frazari* from both ends of the Gulf appear to be the same as those in Scammons.

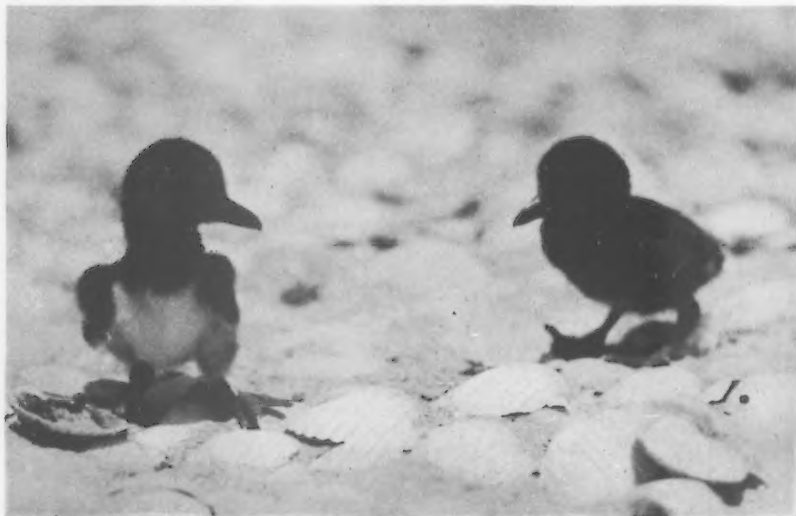


Fig. 27. TWO DOWNY OYSTER-CATCHERS, OF ONE BROOD, YET ONE WHITE-BELLIED, THE OTHER DARK-BELLIED. SCAMMONS, MAY 23, 1926.

We found and photographed a pair of downy young not over a few days old. These youngsters are obviously of the white and black types, respectively; we have the skins to show that there is no photographic illusion here. So we have very strong evidence that the black and the white phases do mate and do produce fertile offspring and that the young have partaken of the coloring, one of one parent and one of the other. These little birds are not mongrels, though we know from some adults that occasionally there are chicks which do inherit from both parents. Comparison shows that the white-breasted downy does not differ at all, at a cursory glance, from a baby taken on Coronado Island in the Gulf.

The introduction of other factors makes it a much more complicated task than appears on the surface to determine the precise status of the bird we found in Scammons. If there are intergrades, we have to give up the idea that the Black Oyster-

catcher is properly named; it should be *Haematopus palliatus bachmani*. That there are occasional hybrids is probable, for both species are notorious wanderers. We took a black at San Geronimo, which seems half-way in color between the "blacks" of Alaska and those of the lagoons. The birds with parti-colored bellies suggest intergrades, in as much as they are not true melanistic phases. But the backs of the birds with parti-colored bellies do not differ from those of any of the other lagoon or even Gulf oyster-catchers, and the characteristic differences in the length of the bill include all intermediate sizes and occur seemingly without regard to color.

My own conclusions from this medley is that the "black" has acquired protective coloration against the water swept rocks of the north, while the white belly of the *frazari* renders it less conspicuous on the sandy beaches where it lives. The change in natural background is quite abrupt. On the Pacific side of Baja California del Sud the condition we found at Scammons probably occurs with a constant lessening in the number of blacks as far as Cape San Lucas. Within the Gulf of California proper no "blacks" have been reported. I do not believe intergradation has as yet been established nor that the color or bill length of any individual bird is more than a matter of accident, their ancestry being always the same. *Frazari* is strongly the predominating type, due very likely to the gradual extinction of the black by survival. If this is correct, then in Scammons there is but one oyster-catcher, the Frazar.

Egg measurements follow, but I have not enough available material to make them of much value.

W. L. Dawson:	2.21 x 1.53
San Luis Islands:	2.20 x 1.56
Scammons:	2.22 x 1.53
"Blacks" from the north:	2.20 x 1.53

OSPREY

Apparently the Osprey breeds here and there all across North America and maintains a contact with his neighbors sufficiently intimate to prevent geographical isolation. The nesting instincts of the birds from the two coasts are so closely parallel that one would hesitate before considering the birds we found in Scammons as anything but *Pandion haliaetus carolinensis*. Apparently the first choice of the Osprey everywhere but in a wooded country is so to place her nest that she can see into it or from it, in every direction. As she seldom realizes this ideal, her next choice is a pinnacle of rock or the top of a ledge, or even the backbone of an island where she will have a three-way view at least. She shows a marked preference for scenery over inaccessibility and for islands rather than mainland. In a wooded country certain types of trees are her ideal. A throw-back of instinct, pregnant with meaning, is the eagerness with which she nests on the flat tops of oil derricks in a treeless and arid country as, for instance, at Santa Catarina Landing.

In Scammons she limits herself to the islands. Years before the memory of any of those who now travel these waters a great log drifted in and was dropped high and dry on one of these islands in the middle of the bay. Ever since, according to tradition that runs back fully a century, there has been a nest on it, kept up and occupied. Of the remaining dozen or more nests we found all had been built either on the beaches or else on the damp soil of the marshes. One even stood where the higher tides surrounded it to the depth of a foot or more. All were very large affairs, apparently being rebuilt and added to year after year. The tops are flattened without being cupped and while there is no lining in a strict sense of the word, there is enough extraneous material to give the upper part a level and solid surface. The nest photographed is typical of the others.

We brought home six young for the San Diego Zoo. Most of the other young were on the verge of flying, being a month or two later than the immature birds of San Luis. Unfortunately I am limited by a wise law and have not yet sufficient osprey eggs of western take to make comparisons of value.

RAVEN

As nothing we found in Scammons can shed light on the contradictory views of the status of the various races of the raven, I will merely record that we found some subspecies of *Corvus corax* nesting very sparingly on the earthen cliffs along the south shore. Their nests, as always when not in vegetation, are built under an overhang to



Fig. 28. OSPREY AND NEST, ON THE BEACH AT SCAMMONS, MAY 24, 1926.

Wright M. Pierce, copyrighted photo.

prevent the pebbles from rolling in, and the extremely thin shells are further protected by a deep and exquisitely fine lining. When we arrived, the young were already on the wing and so I am not sure that more than one pair breeds in the part of the lagoon that we visited.

We saw a raven going through a performance which the fishermen tell us is not at all unusual. The bird had a clam in his beak and was carrying it to a height of thirty feet or so, then dropping it. For many miles there was no rocky ground on which it would break, and so, when he lit beside and examined it, he could do no better than take it into the air and try again. We were travelling past him when we first noticed him, and he was still on the job when he disappeared from view. So, though I have few kindly words for ravens, I must add perseverance to undoubted cleverness.



FIG. 29. NESTS AND EGGS OF THE LARGE-BILLED (AT LEFT) AND LAGUNA (AT RIGHT) MARSH SPARROWS.

Photo by the author.

MARSH SPARROW

This bird has had various names assigned it by different recent authorities, but all refer to the sparrow which breeds at Abreojos Point (*Passerculus halophilus*). The south channel of Scammons runs back until it is at no great distance from that Point, and we are perfectly safe in assuming that the birds which breed there are the same as those we took, especially as this identification has endorsement of the San Diego Natural History Society. How far down the coast these particular sparrows extend is still an open question; but their northern breeding limit, it seems certain, is coincident with that of the San Ignacio Area.

They are very common in the marshes, both insular and mainland, all over the lagoons. Their actions resemble closely those of the familiar Belding Marsh Sparrow (*Passerculus beldingi*) and the Large-billed Sparrow (*P. rostratus rostratus*). They are all busy little souls, forever making short flights to thick tufts of grass or branches of dead bushes, never paying much attention to us, yet not for an instant losing their keen perception of our presence. The always watchful eye permitted no close approach. It is not possible to estimate the number present beyond stating that they were fully as thick over suitable spots as are the Belding in Southern California similarly located. We were far too late for the breeding season, which must be at its height in April.

I have had the good fortune in the last two years to examine at least twenty nests each, in situ, most of them empty, sad to say, of the Belding Sparrow, which breeds freely at least as far as El Rosario, of the Lagoon Sparrow of Scammons, and of the Large-billed Sparrow below Portolabomba on the Colorado River. There are certain comparisons to be made between these nests that are of value—and of great value, because of unvarying constancy of special construction. Both of the Pacific Coast races build neat nests, so nearly alike as to be indistinguishable. They are nicely rounded and fairly well lined with slender leaves and feathers, but so poorly put together that with the least careless handling they fall to pieces. Ordinarily they are made of shreds of seaweed or leaves and some dead grass stems. Contrast this with *P. r. rostratus* which I have found only in living grass and whose nests are constructed from grass stems alone. They not only have no lining but there is not even as much as a thinning toward the inside.

The sites of the nests and the behavior of the birds are very similar as between the two northern races. *Rostratus* nests only in the long grass which is subject to tidal overflow and is to be found near the mouth of the Colorado River, a yard tall, Bermuda-like growth subject to a monthly wetting; while *beldingi*, in addition to the marshes, will nest in salicornia, often even coming onto dry land to do so. The Lagoon Sparrow (*halophilus*) does not care for anything moist. His first choice is a runt growth of salicornia just a few inches high. This is found not unfrequently in small patches where the tide moistens but does not overflow. Here the sparrow hides his home cleverly, utilizing to the utmost the cascades of weed growing over rough ground or small mounds. There was one very small island well back from the mouth of the lagoon that was fairly covered with cactus, a cholla-like growth supporting long drapings of grey moss. The birds played about in it as do the house finches at home; and they bred in it, too, sometimes as much as four feet above the ground, concealing their nests most carefully where the parasite was thickest. Nor are these sparrows averse to building on the dry alkali itself, sometimes a hundred yards from the water, but always artfully hiding under a spreading branch. I flushed three of the birds alto-

gether, within a yard of my feet; two had babies and one a nice fresh set of three eggs. In each case the bird gave the most convincing demonstration of the broken wing act I have ever witnessed.

I have far too few eggs to show any differences there might be in the three sparrows discussed. There are such wide-spread variations within each species that a very large series would be required to show even average differences. It is the psychological individualities of the three birds that is of chief importance. Mr. A. M. Ingersoll was accommodating enough to allow me to compare some nests of the Lagoon Sparrow with his extensive series of those of the Belding. The latter varied to a marked



Fig. 30. SUCH IS SCAMMONS: LOWER CALIFORNIA REDDISH EGRET OVER THE MARSH.

Wright M. Pierce, copyrighted photo.

degree, but at the same time had many characteristics which were always present. Into this series *halophilus* melted as perfectly as other nests of *beldingi* could have done. The striking difference of the nest of *rostratus*, however, shows that that bird must have inherited its nesting instinct through a very different line from that of either *halophilus* or *beldingi*. On the other hand, the close similarity between the nests of the latter two almost prove a specific relationship. Considering the migration routes of these birds, there seems to me to be no question that *halophilus* and *beldingi* should be considered subspecies of one species, and therefore the bird of Scammons should be named *Passerculus beldingi halophilus*.

San Diego, California, October 14, 1926.

NOTES ON THE OCCURRENCE AND DISTRIBUTION OF SOME
SOUTHEASTERN ALASKAN BIRDS

By G. WILLETT

THE RECENTLY published Pacific Coast Avifauna number 17 on the birds of British Columbia, by Brooks and Swarth, was naturally of peculiar interest to the writer, who for a number of years has resided in southeastern Alaska, a territory immediately contiguous to that covered by this distributional list. A large number of the species enumerated in it are common to both British Columbia and southeastern Alaska; and the following notes are submitted with the idea that a comparison of the occurrences of certain of the species in the two localities may prove of interest.

To the writer one of the most interesting features of field ornithology is the fact that the observations of different field naturalists in the same or slightly different localities are almost certain to depart from one another markedly in some features. For instance: The British Columbia list states that *Stercorarius pomarinus* is a scarce migrant along the coast and *Stercorarius parasiticus* fairly common. The writer, only a few miles to the northward, finds conditions reversed in regard to these two species. While residing at Craig, west coast of Prince of Wales Island, *S. pomarinus* was found common in migration each fall between August 5 (1921) and October 7 (1922). A great many were seen each year and a number of specimens were taken, though they were generally wild and hard to collect. They were following flocks of gulls and shearwaters and obtaining their rations in the usual manner. They were apparently rare in spring, a bird seen May 16, 1921, being the only record for that season. Not a single specimen of *S. parasiticus* was ever noted in the vicinity of Craig, the only examples of this species seen in the region being occasional birds well out in the open sea.

Branta nigricans, *Pisobia bairdi*, *Ereunetes pusillus* and *Calidris alba* are all recorded as common along the British Columbia coast. The writer has never seen a living specimen of the first three of these birds in southeastern Alaska, and has not found the Sanderling anywhere excepting at Sitka Bay, where they were not very common. Fred Gray, of Wrangell, has taken two specimens of Black Brant during twenty-five years collecting and considers them very rare in that locality. It seems probable that the species comes south well off-shore and swings in to the coast somewhere south of the Alaska-Canadian boundary.

Rissa tridactyla pollicaris. This bird is listed as a straggler from the north and only a few records mentioned. If no more plentiful than this on the British Columbia coast, the puzzle is, where do they go from here? They are abundant in southeastern Alaska as a migrant only, though sometimes remaining as late as November 12 (1920, Wrangell). My only winter record is of a single immature bird seen on a street in Ketchikan, January 23, 1925. This bird was sluggish and apparently sick. The Kittiwake is abundant in fall migration, usually between August 10 and October 15, and less so in the spring between April 25 and June 1. In the northern half of the Alexander Archipelago it is fairly plentiful throughout the summer months, but apparently non-breeding.

Larus occidentalis. Among the gulls following boats leaving Puget Sound for Alaska there are frequently a few of the above species. The writer has made the trip a dozen or more times and has always been interested in watching to see how far these birds would go before turning back. They have several times followed well into

British Columbia waters, and on one occasion, November 9, 1924, a single bird remained with us as far as the south side of Queen Charlotte Sound, after which it was not further seen.

Xema sabini. The deduction that the line of migration of this species is probably some miles out to sea is undoubtedly a correct one. On August 24, 1917, the writer encountered large numbers of these birds in the open water between Forrester and Dall islands. They were flying south in company with Arctic Terns and Long-tailed Jaegers. They were common in spring migration off Forrester Island June 2, 1916, and May 20 to 30, 1917. Either the dates of their migration or the route of the same must vary, however, as they were not found in the above localities on corresponding dates during 1919 and 1920. Only a few stragglers have been noted along shore and these all immature birds.

Phalacrocorax auritus cinnatus. The status of this bird in southeastern Alaska is apparently about the same as in British Columbia. It is rather common throughout this region in winter, especially where there are schools of small fish. Immature birds are occasional in summer, but I have never seen adults at that season. My earliest fall record for adults is September 11 (1921, Craig), and latest in spring May 8 (1922, Craig). I doubt exceedingly that this bird breeds anywhere on the coast in this region. Careful questioning of many people from different localities has led to no information as to where it does breed.

Phalacrocorax pelagicus robustus. The writer has carefully examined and measured somewhere in the neighborhood of fifty specimens of breeding Pelagic Cormorants from southeastern Alaska, and a number of years ago concluded that there was no valid reason for recognition of *robustus* as a subspecies. The same idea is held by Bent in his *Life Histories*. Slender-billed and heavy-billed birds may be found breeding in the same colonies, and other measurements vary considerably.

Lophodytes cucullatus. On November 24, 1922, at the head of Trocadero Bay, near Craig, while the writer was hiding behind a stump awaiting a flight of geese, three immature Hooded Mergansers swam up to within twenty feet and fed busily for about ten minutes. This would extend the winter range of this bird some distance up the coast.

Fulica americana. Two birds taken at Craig in 1921, a female November 26 and a male December 25, may constitute a northern record for the coast district.

Accipiter velox. Though Brooks and Swarth record this bird, in winter, only in the "extreme south" of British Columbia, it is occasionally met with at that season in every locality visited by the writer in southeastern Alaska. It was seen at Wrangell January 2, 1921, at Craig November 22, 1922, and a female taken near Ketchikan February 9, 1926.

Aquila chrysaetos. The three following are records for the coast district. Female taken by A. M. Bailey near Juneau, September 23, 1920; bird shot by James Lou near Craig February 5, 1923; and another shot by D. Rutherford near Ketchikan January 15, 1924. The feet and legs of these last two birds were brought in for the bounty and were examined by the writer.

Falco sparverius sparverius. A sparrow hawk was seen at Craig September 11, 1919, and another at Wrangell April 11, 1921. A. M. Bailey saw a bird at Craig March 10, 1920, and collected a pair near Juneau September 11 the same year.

Colaptes auratus borealis. A yellow-shafted flicker was shot at Craig October 21, 1919, but was not killed outright and escaped in the thick brush. Another was seen at close range at Wrangell October 11, 1920. On October 3, 1925, a female was collected near Ketchikan. This specimen is a hybrid between *auratus* and *cafer*, but nearer the former in appearance.

Euphagus carolinus. Two birds taken at Wrangell October 10, 1920, and another seen November 30, same year. Male seen in same locality January 2, 1921, and another two days later.

Leucosticte tephrocotis littoralis. Two birds taken by Fred Gray at Wrangell December 30, 1920. Two birds seen by the writer in the same locality April 7, 1921.

Bombycilla garrula pallidiceps. A. M. Bailey saw several flocks at Wrangell November 27, 1919, and the writer saw ten or twelve birds at Ketchikan January 18, 1925.

Bombycilla cedrorum. Three birds seen in a brush thicket in Ketchikan July 14, 1924, and six or eight in same locality next day.

Lanius borealis. Not rare at Wrangell in winter, though rather wild and hard to collect. Earliest seen October 12 (1920), and latest March 5 (1921). Several specimens taken during winter of 1920-21. A male taken at Craig November 30, 1921, was the only one seen in that locality.

Certhia familiaris occidentalis. Occasional throughout the winter at both Craig and Wrangell. Specimens taken at this season in both localities.

Planesticus migratorius caurinus. Fairly common in summer, but much more abundant during migrations, September 10 to October 20, and March 25 to May 12. Rare in winter. One seen January 29, 1923, one December 11, same year, and one February 23-24, 1924, all at Craig. Eggs taken at Ketchikan May 30, 1925.

Ixoreus naevius. Common throughout winter some years, rare during others, and some winters not seen at all. Very abundant at Craig, winter of 1919-20; not seen at all between September 21, 1921, and April 27, 1922; occasional throughout winter of 1922-23. Not seen at Ketchikan during early winter of 1924-25, the first, a single bird, being noted on January 18. Several were seen the day following, and the species was fairly common during the rest of the winter.

Ketchikan, Alaska, February 18, 1926.

SOME BIRDS OF THE GOLD LAKE DISTRICT OF THE
SIERRA NEVADA, CALIFORNIA

WITH ONE ILLUSTRATION

By MARGARET W. WYTHE

AT THE NORTHERN end of the Sierra Nevada lie the two districts popularly known to California's summer vacationists as the "Feather River country" and the "Gold Lake region". Feather River has been a mecca for summer visitors for so long that it has lost much of the freshness and charm of more remote parts of the mountains. As yet the Gold Lake region is one of the accessible parts of the Sierra Nevada that has not been ruined by auto highways and tourist accommodations. Here the bird student may camp in primitive simplicity and have ideal opportunity for becoming acquainted with mountain bird life.

Located by maps, the Gold Lake region is situated on the southern border of Plumas County, extending a few miles south into Sierra County. Mount Elwell, 7846 feet altitude, is the only high, prominent peak in the Gold Lake district, although south of the group of Bear Lakes rises a ridge to a height of 7500 feet; and farther south, beyond Salmon Lakes and Sardine Lakes, rise the Sierra Buttes, 8616 feet high. Mount Elwell stands directly and steeply above the north shore of Long Lake, in a bare, rocky wall on the lake side, and is so much higher than the surrounding country, with such a sweeping vista in all directions, that it forms one of the forest reserve fire lookouts.

From the summit of Mount Elwell the Gold Lake region can be seen in great detail. All about the southern side of the mountain, in rocky basins with boulder-strewn shores, and in tree-rimmed hollows, nestle clusters of lakes, some large, some small. Gold Lake, with a length of nearly two miles, is the largest; Long Lake, at the base of Mount Elwell, is next in size. Five of the Bear Lakes group can be seen—the three Bears, Silver, and Round lakes. Gray Eagle Creek drains most of this lake region, being a tributary to the Middle Fork of Feather River. It carries the water of Long Lake, and, by Bear Creek, a short intermediary stream, the waters of the Bear Lakes group also. Gold Lake is drained by another stream, Frazier Creek, a few miles to the east of Gray Eagle canyon. In the region, as a whole, there is considerable forest; however, where the lakes are clustered the closest, from the south-east rocky face of Mount Elwell to the rocky ridge south of the Bear Lakes group, treeless, rocky and boulder-strewn surfaces appear on most of the higher slopes, these persisting at many points down to the borders of the lakes themselves. Thus, a bird's eye view of the area shows a "spotty" appearance, of alternate bare, rocky patches and wooded portions.

The predominating forest tree of the region is the red fir. Associated with the red fir are good stands of lodgepole pine. Next in point of numbers is the yellow pine. This tree, here at the upper limit of yellow pines, is represented by scattered, large-coned individuals (presumably Jeffrey pine), in thinner forested portions and in mixed tree-chaparral belts up to about 7000 feet. Less numerous than the yellow pine is the silver pine. This is not so generally distributed as the other conifers, and is found on the more shaded slopes bordering some of the lakes and canyons, beginning at about 6200 feet, where the silver fir peters out. Silver fir, at this altitude at the upper limit of its distribution, grows as single trees or small groups of trees, in stands of red fir. Alpine hemlock, in scattering groups of small trees, appears on a few

north-facing slopes. In moist, sheltered places near the borders of the lakes are a few small trees of the mountain ash. Aspen is also to be seen in a narrow belt along Bear Creek. There are two types of chaparral in the region. At lower altitudes it consists largely of green manzanita, service berry, deer brush, bitter cherry and chinquapin. At higher levels these plants are mostly replaced by huckleberry oak, Sierra plum, snow bush and dwarf manzanita. The most conspicuous shrubs along the margins of lakes, snow-water ponds and streams are narrow-leaf alder, creek dogwood and willows of several species.



Fig. 31. THE GOLD LAKE REGION, SHOWING LOCATION OF CAMPS OF 1917, 1920, AND 1922; AND, APPROXIMATELY, THE ROADS AND TRAILS IN THE REGION.

Nine weeks, during three summer vacations, between the dates of June 26 and July 24, cover my total sojourn in the Gold Lake region. These nine weeks afield in the same place, with eyes and ears on the alert, have resulted in some more or less intimate acquaintance with the birds to be expected in this small bit of the Sierra Nevada.

The spot chosen for camp in 1917 (June 26 to July 14) was in a group of lodgepole pines at the edge of the narrow belt of aspens that flank Bear Creek. On the west of this aspen belt was a fringe of willows bordering the stream at the edge of a meadow. On the east of the group of lodgepoles was a rocky slope with a sparse growth of small trees and some chaparral. Behind this rose one of the steep, red-fir-lodgepole covered slopes, separating Gray Eagle canyon from Frazier Creek canyon.

It was at this camp site that three nesting birds proved especially interesting. For several days we had noted Tree Swallows (*Iridoprocne bicolor*) repeatedly flying through camp. They were picking up feathers that leaked from one of the sleeping bags each day when it was turned about for airing. We followed up the birds and found them using the feathers for nest lining in a nearby aspen. This led us to hunt for more nesting swallows among the aspens and we located nest holes of several other pairs of Tree Swallows during our stay. A female Calliope Hummingbird (*Stellula calliope*) was observed frequently about the canvas hammock and we supposed at first that it was after insects which had dropped from the trees, until one day, while lying in the hammock it was visited by the bird and I discovered the purpose. I was first aware of Calliope's presence by feeling it pecking on the under side of the canvas. It soon made its appearance above, at my feet, and continued to peck, soon having its bill well filled with lint from canvas and ropes. With this it flew in a bee-line to high up in a neighboring pine. These visits for nesting material lasted several days. The third nesting bird directly at our camp site was the Mountain Chickadee (*Penthestes gambeli abbreviatus*). When first noted, a pair was carrying food to young in a hole of a lodgepole pine, and the birds were still feeding the nestlings when we broke camp.

The camp site of 1920 (July 10 to 24) and 1922 (July 7 to 20) was in Bear Creek canyon, just over a low ridge north of Bear Lakes, and several hundred yards to the west of Bear Creek, on the 6300-foot contour. On three sides it was bordered by narrow streamlets coming from a number of nearby springs. The fourth side, on the north, was a marshy meadow which bordered a lake called Grassy Lake, where Bear Creek and other small streamlets flowed into it. The meadow was at one time undoubtedly a part of this lake. The camp site of 1917 lay on the east side of the same meadow. The area of the camp islet formed by the streams was about 200 by 300 feet.

Scarcely had we dragged our camp equipment over an improvised foot bridge before we had our first glimpse of what proved to be the best find of the trip. On one of the lower branches of the largest fir on the islet, about twenty feet above our heads, appeared a bright red Pine Grosbeak (*Pinicola enucleator californica*), which sang snatches of song for some minutes before flying away. Several times during the afternoon it reappeared in the same place and sang, apparently unconcerned by our presence. Early next morning (July 12) one of our party discovered that the Pine Grosbeaks were nesting in a young lodgepole pine near his sleeping bag (see R. Hunt, Condor, xxiii, 1921, p. 187).

It was quite a surprise to meet with nesting Pine Grosbeaks here, for, except for a few plants suggestive of the Hudsonian Zone, the surroundings were otherwise Canadian. In 1917 a male Pine Grosbeak had been seen; while in 1922 a pair frequented the island all during our stay, feeding on fir and lodgepole pine tips, calling and singing; but though carefully watched and followed about, no sign of nesting was manifested. The same year two other pairs were spotted in the near vicinity—always observed in the same places: one pair foraged at the junction of the main road and that leading to Camp Elwell; the other pair foraged at the intersection of Bear Creek and the main road. As in 1920, all these birds when observed were in red firs or lodgepole pines (both trees of the Canadian Zone).

Further evidence, however, was found to convince us that this camp site represented a tongue of Hudsonian Zone, or, at least, a mingling of so-called Canadian and Hudsonian elements. White-crowned Sparrows (*Zonotrichia leucophrys leucophrys*) were present in the willow thickets at the edge of the meadow. In both 1917 and 1920 they were heard singing daily, and at frequent intervals they foraged through the camp sites. It was suspected that they were nesting here, although no actual

evidence was observed. In 1922, the continued notes of alarm of an adult, sitting conspicuously on a lodgepole limb at the edge of the willows on the margin of the meadow, led to the discovery of a nest. This was situated a foot above the ground, the nest materials being interwoven about, and laid on top of, several slanting willow stems. On July 14 it contained three down-covered young and one infertile egg. A few days later the nestlings had disappeared, probably destroyed by some predacious animal, as they were still too small to leave the nest.

Birds of particular interest at this camp were the infrequent visitors, transients passing through in a day's foraging and not appearing again. Thus, Hermit Warblers (*Dendroica occidentalis*) were observed in both 1920 and 1922: one adult male, in an old lodgepole, in 1920; in 1922, a family group foraging through the conifers one day. In 1920, a singing parent and family of young Cassin Vireos (*Vireo solitarius cassini*) wandered into camp one day, foraging through the trees for a brief time. Once only, in 1922, just long enough to observe it while singing, a Lutescent Warbler (*Vermivora celata lutescens*) passed by along the willow margined meadow.

In our walks through the district we came definitely to associate certain birds with certain portions of the region. Mountain Quail (*Oreortyx picta plumifera*) were sure to be heard at sunset on the fir-covered ridge which separated Gray Eagle canyon from Frazier Creek canyon. Here, and also on the meadow near camp, at early morning and late afternoon till dark, were always Pacific Nighthawks (*Chordeiles virginianus hesperis*). The north-facing slope of this same ridge, far above Gold Lake, and in one of the heaviest forested areas, was the only place where Sierra Hermit Thrushes (*Hylocichla guttata sequoiensis*) were heard. In the stillness of early morning after sunrise, and again toward sunset, their songs greeted us at long intervals as we took the trail from Bear Lake to Gold Lake. Only a few Mountain Bluebirds (*Sialia currucoides*) were noted. Most of these were found on the north side of Gold Lake, in an open meadow which was recovering from the effects of previous sheeping. Two families of young were seen here in 1917, on snags of dead trees. Another place where Bluebirds were occasionally seen was on the east side of Round Lake. At Blairsden a pair was found nesting in a hole under the eaves of the railroad station the day we broke camp, July 24, 1920.

At the islet camp (1920, 1922) several species were nesting during our July visits. Golden Pileolated Warblers (*Wilsonia pusilla chyseola*) and Western Warbling Vireos (*Vireo gilvus swainsoni*) built nests in the willows, the latter birds singing so persistently all day long as to become almost tiresome to listen to. In 1920 a male Ruby-crowned Kinglet (*Regulus calendula cineraceus*) sang from a favorite perch on the flat upper surface of a fir limb, where it sat for minutes at a time with fluffed out feathers and red crest gleaming in the sun. Its song was unique, never varying in utterance, and sounded more than anything else like the words "you're cheap, you're cheap, you're cheap"! We felt sure that there was a nest nearby but were unable to locate it. However, before we left, the family of young, fed by both parents, was observed for a few days on and near this fir tree. Other occupied nests observed at this camp site were Western Wood Pewee (*Myiochanes richardsoni*), Western Chipping Sparrow (*Spizella passerina arizonae*), and Audubon Warbler (*Dendroica auduboni*).

In the Gold Lake region as a whole, the nesting birds most frequently noted were Western Robin (*Planesticus migratorius propinquus*) and Sierra Junco (*Junco oreganus thurberi*), while a number of immature and one nestling Green-tailed Towhee (*Oreospiza chlorura*) showed that the nesting season was not yet quite passed for this species.

During the three summers spent in the Gold Lake region, 54 species of birds were observed. For other vacationists who may visit this part of the Sierra Nevada and wish to know what birds may be expected in the Gold Lake region, the following list of species is given. Further observations and study will be helpful in more accurately determining the proper niches of these birds than could be expected from the brief periods of observations of the present writer. The niches that many of the birds occupied among certain assemblages of plant growth soon became fairly well established in our minds. Four distinct associations are to be found in the region: forest association; mixed forest-chaparral association; riparian association; meadow association. All of these associations were within sight of the various camps, so that the studying of them was a matter of daily observation. A few of the birds seen have not been listed, some because seen but once in flight overhead, such as Red-winged and Brewer black-birds, Pelican, Red-tailed Hawk, etc., others because found on the Feather River at Blairsden, at a much lower altitude than the Gold Lake region itself, such as Screech Owl, Anna Hummingbird, Sparrow Hawk, etc. Some birds, observed constantly in more than one association, are so listed.

FOREST ASSOCIATION

Sierra Grouse (*Dendragapus obscurus sierrae*)
Modoc Woodpecker (*Dryobates villosus orius*)
Sierra Red-breasted Sapsucker (*Sphyrapicus varius daggetti*)
Williamson Sapsucker (*Sphyrapicus thyroideus thyroideus*)
Northern White-headed Woodpecker (*Xenopicus albolarvatus albolarvatus*)
Red-shafted Flicker (*Colaptes cafer collaris*)
Olive-sided Flycatcher (*Nuttallornis borealis*)
Western Wood Pewee (*Myiochanes richardsoni richardsoni*)
Blue-fronted Jay (*Cyanocitta stelleri frontalis*)
California Evening Grosbeak (*Hesperiphona vespertina californica*)
California Pine Grosbeak (*Pinicola enucleator californica*)
Cassin Purple Finch (*Carpodacus cassinii*)
Pine Siskin (*Spinus pinus pinus*)
Western Chipping Sparrow (*Spizella passerina arizonae*)
Sierra Junco (*Junco oreganus thurberi*)
Cassin Vireo (*Vireo solitarius cassinii*)
Audubon Warbler (*Dendroica auduboni auduboni*)
Hermit Warbler (*Dendroica occidentalis*)
Sierra Creeper (*Certhia familiaris zelotes*)
Slender-billed Nuthatch (*Sitta carolinensis aculeata*)
Red-breasted Nuthatch (*Sitta canadensis*)
Short-tailed Mountain Chickadee (*Penthestes gambeli abbreviatus*)
Western Ruby-crowned Kinglet (*Regulus calendula cineraceus*)
Townsend Solitaire (*Myadestes townsendi*)
Sierra Hermit Thrush (*Hylocichla guttata sequoiensis*)
Western Robin (*Planesticus migratorius propinquus*)

MIXED FOREST-CHAPARRAL ASSOCIATION

Mountain Quail (*Oreortyx picta plumifera*)
Pacific Horned Owl (*Bubo virginianus pacificus*)
Pacific Nighthawk (*Chordeiles virginianus hesperis*)
Sierra Junco (*Junco oreganus thurberi*)
Yosemite Fox Sparrow (*Passerella iliaca mariposae*)
Green-tailed Towhee (*Oreospiza chlorura*)
Western Tanager (*Piranga ludoviciana*)
Calaveras Warbler (*Vermivora ruficapilla gutturalis*)
Mountain Bluebird (*Sialia currucoides*)

RIPARIAN ASSOCIATION

Spotted Sandpiper (*Actitis macularia*)
Calliope Hummingbird (*Stellula calliope*)
Small flycatcher (*Empidonax*, species ?)
White-crowned Sparrow (*Zonotrichia leucophrys leucophrys*)
Sierra Junco (*Junco oreganus thurberi*)
Green-tailed Towhee (*Oreospiza chlorura*)
Tree Swallow (*Iridoprocne bicolor*)
Western Warbling Vireo (*Vireo gilvus swainsoni*)
Golden Pileolated Warbler (*Wilsonia pusilla chryseola*)
American Dipper (*Cinclus mexicanus unicolor*)
Russet-backed Thrush (*Hylocichla ustulata*)

MEADOW ASSOCIATION

Pacific Nighthawk (*Chordeiles virginianus hesperis*)
Calliope Hummingbird (*Stellula calliope*)
Western Chipping Sparrow (*Spizella passerina arizonae*)
White-crowned Sparrow (*Zonotrichia leucophrys leucophrys*)
Sierra Junco (*Junco oreganus thurberi*)
Lincoln Sparrow (*Melospiza lincolni lincolni*)
Western Robin (*Planesticus migratorius propinquus*)
Mountain Bluebird (*Sialia currucoides*)

Museum of Vertebrate Zoology, Berkeley, California, April 9, 1926.

THE BIRDS OF NATIVIDAD ISLAND, LOWER CALIFORNIA

By CHESTER C. LAMB

NATIVIDAD is a small island off the west coast of Lower California, Mexico. It is just south of the twenty-eighth parallel, and is located four miles northwestward of Point Eugene, being separated from the mainland by Dewey Channel. It lies in a northwest to southeast position, and is about four miles long and from half a mile to a mile and a half in width.

On the southeast side is a wide sandy beach nearly a mile long, and at its northern end is a small pond formed by the high tides. With the exception of a wide level plain above the beach and the low cliffs, the rolling hills of the more southerly end, and a small beach at the southwest side, the island is very rugged and rocky, rising to a height of 491 feet near the center and bordered by rather high cliffs. A large part of the island is covered with ice plant (*Mesembryanthemum*), which was dry at the time of my visit. In some of the ravines two species of small cacti grow, also a small low bush; while on the steep side of the more northern, rugged end, are a few giant cacti. There is no fresh water to be found upon the island.

Natividad Island was no doubt first seen by the Spanish explorers in 1539, when Francisco Ulloa discovered Cedros Island, some few miles to the northward. Since then, Natividad has been visited many times by various naturalists on their way to more southern or northern points; but it is such a formidable, barren and unattractive place that their stay has always been short. I can find no record where any naturalist stayed more than two days, and in consequence the published list of birds is short.

This dreary looking islet was first seen by the present writer from the deck of a steamer some fifteen years ago, and since that time it has always been his ambition to make a protracted stay there. Through the kindness of the Naylor Brothers of San Diego, the opportunity at last came to make the visit. This firm operates a camp for the gathering, by diving, of abalones and seaweed. The abalones are dried and sent to China, where they are considered a great delicacy, while the seaweed goes to Japan for treatment, then back to this country in the form of agar-agar; but now, I believe, a factory has been established in San Diego for the treatment of the seaweed.

On December 17, 1924, I left San Diego bound for Natividad on a little twenty ton fishing boat. The next morning we arrived at Ensenada where the greater part of the day was spent by the captain in securing his clearance papers. In the afternoon we pulled up the "hook" and set out in a calm sea. The next day was spent at sea, and many sea-birds were noted, such as Xantus Murrelets, California Brown Pelicans, Western Gulls, Farallon Cormorants, and Black-vented Shearwaters. That night at 10 P. M. we anchored near the southern end of Cedros Island to deliver some supplies to a lobster camp. The crayfish which are regularly caught for the California market are called lobsters by the fishermen. The next morning we left early for Natividad. In crossing the channel between the two islands large numbers of Xantus Murrelets were seen.

On Natividad Island are some forty Mexican workers, and three or four Russian and Japanese fishermen. Several of the Mexicans have guns, so the birds are not left in undisputed possession. The Mexicans do some damage to the nesting birds, as to them all eggs are edible; and they shoot a few gulls around camp in the way of testing their marksmanship. However, the camp is only temporary, and before long the island will be uninhabited again except for an occasional fisherman.

The period between December 20 and January 13 was spent on the island, and I found bird life there abundant though restricted to a few species. Even on such a

small island as Natividad, one must spend considerable time, if many of the birds are to be found. For instance, I saw a bird the first day not seen again, and on the last day, one not seen previously. Longer observations at different seasons would certainly on account of the nearness of the mainland, produce several others.

According to Nelson (Memoirs of the National Academy of Sciences, 1921) there were but sixteen species of birds heretofore known from Natividad Island. It is the author's good fortune now to be able to increase this number to forty-nine. Below is an annotated list of the species observed about my camp at the southern end and on other parts of the island. Most of the specimens taken by me are now in the collection of Mr. Donald R. Dickey, and I want to thank him and Mr. Adriaan van Rossem for identifying some of the doubtful races.

Colymbus nigricollis californicus. American Eared Grebe. Several seen daily, swimming about the kelp in quiet coves.

Gavia, sp.? Loons were seen several times, but as none was taken I cannot say to what species they belonged.

Ptychoramphus aleuticus. Cassin Auklet. Seen in the channel between Cedros and Natividad islands. It is well known that they nest upon this latter island.

Brachyramphus hypoleucus. Xantus Murrelet. Numerous between the two islands, generally in pairs. They would allow the boat to come nearly upon them before attempting to escape, and this they would do either by diving or flying. It is quite an effort for them to get launched into the air.

Larus glaucescens. Glaucous-winged Gull. Seen daily in small numbers about the camp. Most of them were immature birds.

Larus occidentalis, subsp.? Western Gull. Very numerous and tame about camp. As no specimens were taken I am unable to say whether they belonged to the race *wymani* or *livens*. These birds nest in numbers on the island, I am told by Mr. Naylor.

Larus delawarensis. Ring-billed Gull. Occurred in numbers around camp and near the tidal lagoon.

Larus heermanni. Heermann Gull. One would expect this to be an abundant bird, but I saw only two, both on some outlying rocks.

Sterna maxima. Royal Tern. A common bird, seen daily flying in flocks of fifty or more along the line of the surf at the beach. An outlying rock rather than the sandy beach was a favorite roosting place. Several were shot from time to time in my search for Elegant Terns, which were not found.

Puffinus opisthomelas. Black-vented Shearwater. As is well known, this shearwater nests in crevices and caves, or else makes its own burrow. Practically the entire island is a honeycomb of burrows dug by the birds. It is a strange fact that I never saw a shearwater in the daytime anywhere near the island; but soon after dark one begins to hear their calls, and these are the most curious of bird voices. One might describe the note as somewhat like the bray of a donkey interpolated with a husky snore. In their calling these birds apparently have some system; for sometimes the listener can hear them on all sides, then suddenly all sounds cease and nothing is heard for half an hour or more. They are most noisy just before dawn.

On November 10, I stopped at Natividad Island but did not go ashore. At that time Mr. Naylor told me that the shearwaters were visiting their burrows at night, and that his men had caught many. During my visit I caught many at night in and around their nesting holes, but no eggs were found.

Mr. A. W. Anthony states (Auk, xvii, 1900, pp. 247-252) that he found occupied burrows early in March and on April 10. All the burrows he examined at the latter date contained single eggs. He also says that he found young birds in the burrows in July; and he has recently found young in August. From the foregoing it is seen that the birds, but not necessarily the same individuals, occupy burrows ten months of the year, and I would not be certain that they are not there continuously. In digging out the burrows, I often found them occupied by a pair of birds; but more frequently one bird was found, either a male or a female. The adults at this time showed no signs of early nesting.

The Japanese fishermen caught sacks full of these birds, which they used as bait for crayfishes. Before digging out a burrow they would first ascertain whether or not it was occupied. This they would do by blowing smoke down the hole. If the

burrow was occupied the birds would give voice. The holes are usually shallow, and from three to seven feet long. As the ground is quite sandy, it only takes a few minutes to dig one out. Often the shearwaters sit beside the burrows and then a man with a flashlight or bright lantern can walk right up to them and pick them up; or, if the bird starts to run he can frequently catch it, for it usually has a hard time to get into the air and can only rise against a good wind or by means of a long run down hill. I have thrown a shearwater over a cliff forty feet high, and it could not get started before it struck the water.

I had several shearwaters in captivity during my stay, but they never got tame. They would sneak along in a rail-like manner and try to hide under whatever seemed to give protection, rather than try to escape by flying. In handling them, they prove savage and can soon make the blood come with either their beaks or claws. Several times I put two on the ground to take their pictures, and if I put them too close together, they would immediately start fighting. The Duck Hawks on this island take great toll of their numbers, as indicated by hundreds of pairs of shearwater wings that can be seen on the ground in every direction.

Phalacrocorax auritus albociliatus. Farallon Cormorant. Many were seen about the island. In the spring they occupy large colonies, building their nests on rocky knolls all about the island. The guano is regularly gathered by a small truck brought down for the purpose. It is curious to see auto tracks in that far-away place.

Phalacrocorax penicillatus. Brandt Cormorant. Seen in numbers daily about the rocky shores.

Pelecanus californicus. California Brown Pelican. Many were always about, and I found places where they had been nesting.

Mergus serrator. Red-breasted Merganser. Four or five were seen during my visit. They were always single and flushed from the rocky pools at low tide.

Branta nigricans. Black Sea Brant. Great flocks were seen daily. They feed at low tide along the line of surf, on a thin flat green sea-grass, and then they come onto the beach to rest and get gravel. They are the variet of birds and leave the beach before one reaches within three hundred yards of them. By coming towards them down wind in a rough sea one can frequently get in a couple of good shots. I found their flesh real good eating.

Ardea herodias hyperonca. California Blue Heron. One usually seen daily standing on the kelp offshore. A specimen was taken January 2.

Pisobia minutilla. Least Sandpiper. Seen several times on the beach in small flocks.

Ereunetes mauri. Western Sandpiper. Seen occasionally in company with the preceding.

Calidris alba. Sanderling. Common. Large flocks fed on the plain above the beach. Several specimens were obtained.

Limosa fedoa. Marbled Godwit. Seen in small flocks along the beach.

Catoptrophorus semipalmatus inornatus. Western Willet. Always present in numbers on the beach.

Heteroscelus incanus. Wandering Tattler. One secured January 4, on an outlying rock.

Numenius americanus. Long-billed Curlew. A flock of about twenty was seen daily feeding on the plain. One taken January 3.

Numenius hudsonicus. Hudsonian Curlew. Seen several times in small numbers upon the beach.

Squatarola squatarola cynosurae. American Black-bellied Plover. Often frequented the plains in company with other shore birds; several taken.

Oxyechus vociferus. Killdeer. A flock of eight birds was seen daily on the plain near camp.

Charadrius semipalmatus. Semipalmated Plover. Only one was seen, December 20.

Charadrius nivosus. Snowy Plover. An abundant bird on the beach and plain. Several were taken.

Eupoda montana. Mountain Plover. A flock of about twelve was seen feeding on the plain, December 22, when a few were secured. A single bird was seen January 9. As far as I can find, this constitutes a southernmost record in Lower California, and a new record for the islands off the Peninsula. The species has been taken some 300 miles farther north, near Tijuana. These birds were not associating with the other shore birds, though they did feed among the members of a flock of horned larks.

Arenaria interpres. Common Turnstone. One was usually seen in each large flock of Black Turnstones. They could be readily distinguished by their reddish legs. One was taken December 29, and another January 8.

Arenaria melanocephala. Black Turnstone. An abundant bird on the island, feeding in large flocks, on the rocks and kelp strewn shores.

Haematopus palliatus frazari. Frazar Oyster-catcher. Generally one or two pairs were seen daily, flying over the water or standing on outlying rocks. One day, while lying in a blind waiting for Black Brant, I saw a mixed flock of Frazar and Black oyster-catchers alight on the sand beach. But, as a rule, these birds love the detached rocks, and this was the only time I saw them on the beach. The two species intermingle and I have often seen a Frazar and a Black oyster-catcher standing together on a small rock, or else flying together. I have seen statements that they interbreed, but my visit was too early for their nesting season.

Haematopus bachmani. Black Oyster-catcher. The above statements apply also to this bird, equal numbers of the two species being present. Several specimens of each were taken.

Cathartes aura septentrionalis. Turkey Vulture. One or more birds seen daily flying above the island.

Circus hudsonius. Marsh Hawk. A single bird was seen in this unusual association, flying over, December 22.

Buteo borealis calurus. Western Red-tailed Hawk. Four were seen during my visit; two immature females were secured December 29.

Falco peregrinus anatum. Duck Hawk. I judged there were about six pairs resident on the island. One pair had a nest on a ledge in a large cavern on an outlying rock. Later, Mr. Naylor reported three eggs in this nest. The Duck Hawk here, it appears, lives largely on the Black-vented Shearwaters. Many freshly killed shearwaters indicated this, though I shot a Duck Hawk in the act of grasping a Mountain Plover. This falcon disposes of the shearwater bodies in such a way that the wings are usually attached in pairs. I have often seen the Duck Hawk fly straight out to sea and disappear, and this must be when they catch the shearwaters, for, as I mentioned before, none of the latter was seen daytimes in the vicinity of the island.

Falco sparverius, subsp.? Sparrow Hawk. One seen December 26. As no specimen was taken I am unable to say to which of the races it belonged.

Pandion haliaëtus carolinensis. American Osprey. For a hawk, this bird is common on the island. I knew of eight nests within a half mile walk of camp. These are built on the ground and are easily accessible, except for the ones standing on the outlying rocks. At the time of my visit, all the birds were paired and busily remaking their nests. A set of three eggs was taken January 12. All the nests examined were made partly of Black-vented Shearwater wings, and of one nest seen, all except a part of the foundation was entirely made of wings.

Tyto alba pratincola. American Barn Owl. The only evidence of the presence of this bird is a wing picked up near the center of the island.

Speotyto cunicularia hypugaea. Burrowing Owl. One seen January 12 standing in front of a shearwater burrow.

Ceryle alcyon caurina. Western Belted Kingfisher. A single bird seen December 21, flying along the base of the cliffs.

Sayornis saya saya. Say Phoebe. One was seen sitting on a rock on the plain December 20.

Otocoris alpestris enertera. Lower California Horned Lark. Abundant among the dry ice plant on the plain; in flocks of twenty or more.

Otocoris alpestris insularis. Island Horned Lark. One of the several specimens of horned lark taken proved to be of this race, thus extending its winter range some 400 miles south.

Corvus corax clarionensis. Clarion Island Raven. Abundant and very tame. There were always a few around camp.

Passerculus rostratus guttatus. San Lucas Marsh Sparrow. Abundant on the rocks among the cast-up seaweed at the base of the cliffs.

Amphispiza bilineata deserticola. Desert Black-throated Sparrow. Common in the low shrubbery in the ravines. Two specimens were obtained.

Dendroica auduboni auduboni. Audubon Warbler. Very common, often seen flitting about the faces of the high cliffs.

Museum of Vertebrate Zoology, Berkeley, California, February 16, 1926.

FROM FIELD AND STUDY

Invasion of the Southern California Coast by Elegant Terns.—During July and August of the present year, Miss Agnes Craig of Pasadena was staying at her house at Playa del Rey, which affords a full and unobstructed view of the near-by canals and lagoons, and a portion of the beach and ocean. Early in the afternoon of Friday, July 30, she looked over the area with 8-power binoculars, and saw nothing unusual. Some two hours later, observing a great increase in the size of the flock of gulls and Forster Terns congregated on the exposed tide flat in the main lagoon, she went out to the dunes overlooking the assemblage, and found there a very large flock of Elegant Terns (*Sterna elegans*). She then called Mrs. Josephine Bates, of Pasadena, and myself by telephone, and on the following day we joined her at Playa del Rey, finding the Elegant Terns still there in hundreds. I then telephoned Mr. L. E. Wyman, in hopes that he would go down and confirm our observations. A week passed, however, before he was able to do so.

At the time of their arrival, the color of the bills of most of these Terns was a bright coral red, paling to yellow toward the tips. During the time of their stay the red gradually faded out, leaving the entire bill yellow, bright in tone. The breasts of a great many of the adults were flushed with delicate rose pink, not observable in all lights.

An estimate of the total number of the birds present must be only approximate, as they were often divided into several groups, some of which frequented the adjacent marsh and rested on the flats there, while many came and went between these points and the ocean, where their gleaming white forms beautified the scene day after day. Partial counts were many times made, bearing out the conviction that there was a total of upwards of three hundred birds in the area. A great many were about the Hyperion pier. Bolsa Chica also was visited by small flocks, nine and fifteen being observed there on different dates. The large flock was accompanied by a few young, still being fed. On Friday, August 27, exactly four weeks from the date of their arrival, the majority of the great flock departed as suddenly as they had come; and on the 28th the remainder disappeared, with the exception of two individuals which were seen from time to time about the lagoon and marsh. My last personal record of them was September 17.—FRANCES B. SCHNEIDER, Los Angeles, California, October 10, 1926.

Notes on the Courtship of the Rufous Hummingbird.—The towering flight of the Rufous Hummingbird (*Selasphorus rufus*) and its accompanying whining note, is perhaps well known to most ornithologists, but I am not aware of having heard of or seen in print any account of the whole performance. The following notes may therefore be of interest.

In the displays I have witnessed, which have been many, a careful survey of the ground beneath the performer invariably revealed the female sitting motionless on some twig of the low-growing underbrush, and as the aerial acrobat reached the limit of his upward flight she was seen to turn her head slightly and glance admiringly aloft. The male ascended usually with his back towards his mate, then turning, faced her, and with gorget fully expanded descended swiftly until within an inch or two of her, when spreading both wings and tail he checked himself and soared aloft again to repeat the performance, or else settled on some near-by bush. As he so checked his flight the whining note was produced, undoubtedly by the rush of air through the outspread feathers.

On two occasions, in May, 1925, and May, 1926, I witnessed in connection with the above performance what I believe to be the actual mating of the birds. After one or two towering flights by the male, the female rose from her perch and the male immediately closed with her. Then over a distance of some ten or twelve feet, and horizontally, they swung together backwards and forwards through the air, just as one often sees insects so doing. The regular swinging hum of the wings is hard to describe but is just what one might expect. So fast is this swinging flight, and so close was I, not over four to five feet away in one instance, that I was totally unable to see the birds

except as a blurred streak of color. As the flight ceased I saw them separate, and in one instance the female was seen to fall to the ground, but later to regain her perch, while the male continued his towering flights.

This towering flight, as is well known, has another purpose, namely, to intimidate other birds. However, on May 12, 1923, a male Rufous Hummingbird tried it once too often, when he staged a drop on a Black Pigeon Hawk, and got caught. (The hawk was collected.)—G. D. SPROT, *Cobble Hill, Vancouver Island, September 12, 1926.*

Least Petrel Added to the California List.—The petrels, as a family, are well known to be birds of wide range, and it is therefore not surprising that the Least Petrel (*Halocryptena microsoma*), which nests on islands off the coast of Lower California, should wander into United States waters. There appears, however, to be no published record of such occurrence; and I therefore report that, while collecting birds for the San Diego Society of Natural History in my motor-boat on September 9, 1926, I took a male bird of this species about 500 yards northeast of the whistling buoy off Point Loma. The specimen is now in the collection of the Society.—J. W. SEFTON, JR., *San Diego Society of Natural History, San Diego, California, September 21, 1926.*

A Protective Container for School Specimens.—The San Diego Society of Natural History, in its Nature Study extension work among the rural school children of San Diego County, encountered the problem of the rapid deterioration in bird specimens deposited by the Society in each school. It was found that the usefulness of a study



Fig. 32. MR. WILLIAM S. WRIGHT, OF THE SAN DIEGO SOCIETY OF NATURAL HISTORY, AND THE SPECIMEN CONTAINER HE HAS DEvised.

desired, may be preserved inside the cylinder.

The plasticity of both wood and celluloid permit any variation in the size and shape of the cylinder. If it were desirable to exhibit the underside of a wing, that particular specimen could be prepared with one wing raised and the container made correspondingly taller. Furthermore, these cylinders have been found equally suitable for study

skin, when handled by the children, was limited to but a few months, even when the system was adopted of preparing the school skins with a stick extending beyond the tail, for handling purposes (see Grinnell, *Condor*, xxvi, 1924, p. 107). A complete enclosure, but one that permitted a view of back, breast and side, was seen to be the only real solution.

Such a container has now been devised, which is in the form of a cylinder flattened on one side. The two semicircular ends and the flat side or "bottom" are of wood, the remainder of curved celluloid. The bird-skin should preferably be made up on a stick, as referred to above, although a sharpened stick can be inserted into a skin already prepared. The stick provides a rigid support for the specimen in the cylinder, being sunk into one of the wooden ends. The beak of the bird, which is placed with one wing downward, rests in a small depression in the other end. The celluloid is fastened to the edges of the bottom and curved ends with small tacks. The heads of the tacks are covered and a finished appearance given to all edges with passepartout binding paper. A descriptive label is pasted on the bottom of the container, and it is thus impossible for the specimen and the "story" to be separated. The scientific specimen label, if

skins of mammals. The main difference in the treatment of mammals is that the stick must be made to extend beyond the nose, to provide the secondary support which, in the case of birds, is furnished by the beak. This is accomplished by thrusting the stick through the skin of the animal—entering just below the left hind leg and emerging just



Fig. 33. THE SPECIMEN CONTAINER, OF WOOD AND CELLULOID.

above the left front leg—and tying the two legs to the stick. As in the case of birds, the mammal is placed with one side toward the wooden bottom of the cylinder.—WILLIAM S. WRIGHT, *Natural History Museum, Balboa Park, San Diego, California, September 21, 1926.*

The Derby Flycatcher near Los Angeles.—On September 4, 1926, a phone message from Inglewood announced that a “yellow-bellied kingfisher” had been killed at a cemetery there. Investigation disclosed the fact that a Derby Flycatcher (*Pitangus sulphuratus derbianus*) had been taken while apparently trying to catch fish in the goldfish pond where Belted Kingfishers had caused much trouble. Its actions, kingfisher-like appearance, and swoops toward the water, from a perch in the tules, were its undoing.

The bird was a female, in full molt. Dissection showed an empty stomach. Dr. H. C. Oberholser, who identified it, suggested that it had probably worked northward from Sinaloa, Mexico, its nearest normal habitat. This appears to be the first record of the species for the United States outside of extreme southern Texas.

The fish-catching habit of *Pitangus* is noted by Hudson, as also by Grayson who says he has “often seen them plunge into the water after large insects and small fish.”—L. E. WYMAN, *Los Angeles Museum, Los Angeles, November 9, 1926.*

Sabine Gull off San Diego County.—Frank Stephens, in his “Annotated List of the Birds of San Diego County” (Transactions, San Diego Society of Natural History, III, no. 2, 1919) does not include the Sabine Gull (*Xema sabini*), although he mentions other pelagic species, such as the Pacific Kittiwake, which are known to occur off the coast of the county. Dr. E. W. Nelson writes (Memoirs of the National Academy of Sciences, XVI, 1921, p. 13): “We were much interested, when a few miles off the mouth of San Diego Harbor (May 15, 1905), to see a number of Sabine Gulls scattered about feeding on the tide lines formed by the currents in the smooth sea. This was, I believe, the first record of these beautiful birds at San Diego.”

However, no Sabine Gulls found their way into the collection of the San Diego Society of Natural History until August 28, 1925, when Laurence M. Huey collected thirteen specimens. Since then there have been added six specimens collected by J. W. Sefton, Jr.—five taken on July 29, 1926, and one on September 13, 1926. All were taken on the ocean within a few miles of Point Loma. Of the 1925 birds, three were in immature plumage and six were adults in various stages of transition from dark to light heads. The remainder and all the 1926 birds were dark-headed. It is safe to assume that the Sabine Gull migrates regularly through Southern California waters.—CLINTON G. ABBOTT, *Natural History Museum, Balboa Park, San Diego, California, September 21, 1926.*

Account of the Discovery of a Rare Bird in Costa Rica.—The Puff-bird (*Micromonacha lanceolata austinsmithi*) was named by Dwight and Griscom (Amer. Museum Novitates, no. 142, 1924, p. 2), from a single bird taken by me at Carrillo, Costa Rica. In view of the fact that I have made subsequent trips to the vicinity of Carrillo, and failed again to meet with this species, also that none of the various collectors visiting that region in the years past have secured it, leads to the supposition that it may be very limited in number of individuals.

The type came to hand thus: The river Frio passes the ranch house, now known as Carrillo, at a distance not greater than five hundred feet. At this location, on the east bank of this turbulent stream, the flood waters have for ages past deposited boulders of all sizes up to four feet in diameter, for a distance of many hundred feet paralleling the stream. Great numbers of young trees grow among this rock litter, and the undergrowth is largely ferns and selaginellas. Hunting through this one rainy morning, I flushed a small bird from or near the ground almost at my feet. It was shot a-wing, thereby adding a genus and a species to the Costa Rican list. All forms comprising the genus appear to be rare. Possibly, semi-crepuscular habit will be found to account in part for this rarity.—AUSTIN SMITH, *San José, Costa Rica, September 6, 1926.*

Feed-table Observations from Diablo.—My free lunch table for such of the birds as choose to patronize it, is located adjacent to and immediately in front of one of the windows of my rooms at Diablo. At such times as I sit close to the window I am frequently within two feet of some of the feeding birds, and thus enjoy excellent opportunity for "close-up" observation of peculiarities in habits, character, and appearance presented by the little visitors.

Several years ago when I maintained a feed table in Piedmont, in noticing the conduct and association of a pair of California Brown Towhees that were continuous daily patrons for more than two years, I was led to think that the birds of this species paired for life. Among the frequent visitors to the feed table at Diablo there is also a pair of towhees, and their association summer and winter has tended to strengthen my conclusion as to the probability that the pairing of the towhees was more than a seasonal affair. Of course, the evidence in these two instances is only suggestive, unless it can be corroborated by testimony of other observers.

Of the patrons of the feed table at Diablo the House Finches, or Red-heads as commonly known, are the greatest in number, and their conduct through the pre-nesting and nesting periods afforded no small amount of entertainment. The male birds in many instances exhibited great consideration for their mates. It was not uncommon to see a male bird pause in its feeding to place a delicate morsel of food in the mouth of its mate, which was generally accepted with much bowing, chirping, and quivering of wings. However, in the pre-nesting period, the females at first were a little shy when the males approached them with the food and made some little pretense of avoiding them, as if they misunderstood the purpose of the attention. During the nesting period this habit was more frequently observed, and even as late as the middle of August it was noted in a pair of old birds. With birds so much alike, except as to coloration in sex, it might properly be asked how I was able to distinguish a pair of birds from the flock. In one case it was a simple matter, for the female had a very strange malformation of the upper mandible, and the male bore a white feather in the right wing. These distinguishing features had been noted first in the winter months, and the subsequent daily visits to the feed table by the pair established a familiarity that could hardly be questioned.

House Finches, like Blackbirds, Quail, Purple Finches, Bush-tits and many other species, after the nesting season gather in flocks and in such relation seek their daily food and roosting places, until the nesting time approaches again, when the flocks are broken up by the birds going off in pairs. Now the question arises as to what extent, if any, do the pairing and nesting relations of the former season or seasons figure in the breaking up of the flocks. Who knows? It would not be surprising if the pairing for life was more common than thought to be. The actions of the pair of birds described above together with the conduct of others of the flock suggested the possibility if not the probability of this. Facts more substantial and reliable in solving the problem might be obtained by trapping and banding a few pairs with distinguishing bands, keeping them under observation for two or three seasons.

Referring to the matter of the female House Finch with the malformation in her mandible, so far I have been unable to determine the exact character of the distortion. Both parts of the bill seem to be growing longitudinally, and are now extended to double the length of those ordinarily seen. The upper mandible is either shorter or so formed that the bird is unable to pick up seed in the manner common to her kind, and therefore is compelled to turn her head sidewise to the ground and pick up the seed

with the "corner of her mouth". Although forced to secure her food by this abnormal method, she does not appear to be at any disadvantage in obtaining her share of seed placed on the feed table.

It seems rather remarkable that a bird, when its bill becomes unfitted to pick up its food in the manner common to its kind, should be able to invent a method of securing its food so at variance with the way taught it by instinct. Instead of starving to death it succeeded in adapting itself to the requirements of the situation.

For the attention of those interested in the migration of birds, I will state that the first Golden-crowned Sparrow to return from the far north to Diablo, appeared at my feed table September 19. This is four days earlier than last year.—FRANK A. LEACH, *Diablo, California, September 20, 1926.*

Shrike Attacking Snake.—The Raptore and perhaps some other birds, the Road-runner for example, are known to eat snakes. I had never ascribed this habit (if it in fact be a habit) to Shrikes. It was somewhat of a surprise to actually see a Shrike assailing a snake, about fifteen inches long, at the edge of a road about a mile southwest of Terra Bella, Tulare County, California, on October 15, 1925.

I assume this Shrike was of the race *Lanius ludovicianus excubitorides*, but a Shrike it certainly was. I was driving northwardly in an automobile. The wheel of this car is on the left side. I was driving rather slowly (as I always do) and noticed a bird ahead of me springing about in the most energetic manner at the left edge of the road. When I was less than a car-length away, the bird flushed and I pulled off to the right in order to examine the spot from which the bird had risen, after first watching the bird in flight so as to be sure of its identification. The bird flew off a few yards and came to rest in a small tree. I had a very good look at it and know it was a Shrike.

I then investigated the place at the side of the road, where I found a small snake writhing about in extremis. Two inches from the head, on the under part, was a small, fresh, irregular and bleeding incision. No other injury was visible, but the snake seemed clearly done for. It was unable to crawl off the road, although I urged it with a weed stalk. There seems no doubt but that I had disturbed a Shrike while it was securing a meal, or a supply for several meals, although the performance had not reached its denouement.—CLAUDE GIGNOUX, 73 *The Tunnel Road, Berkeley, California, November 22, 1926.*

A New Race of Sclater Oriole.¹—The following comments serve as a synopsis of the conclusions reached in identifying a series of *Icterus sclateri* Cassin, recently collected by the writer in Salvador, for Mr. Donald R. Dickey.

Seasonal and individual variation are the factors governing the amount of black present in the backs of adults. Individual variation is by far the more important. There appears to be no correlation between altitude and the relative amounts of black and yellow present, for the extremes were encountered practically wherever the species occurred. Indeed, the only bird with back practically solid black is a breeding male from Lake Olomega at an altitude of 200 feet, while the yellowest backed extreme is also from the same locality. Nor are birds from San Salvador (altitude 2100 feet) in any respect different from the lowland individuals. Seasonal variation results from the wearing away of the yellowish tips and edgings to the feathers, thereby increasing the relative amount of black present. No association of size with altitude is apparent. The two largest males (wing 111.5-112.5 mm.) are from Divisadero, altitude 800 feet; and males with wings varying from 105.0 to 109.0 are at hand from Lake Olomega and San Salvador. The two large males from Divisadero are of average coloration, in other words with a considerable amount of yellow streaking in the back. The very smallest male examined is from "Guatemala" (wing 101.0) and has only a trace of yellow in the back. It is without date, but in fresh plumage, and its back with a slight amount of abrasion would have become practically solid black. From the above it is evident that birds with black backs and of large size are not confined to altitudes above 2000 feet; that small birds with spotted backs are not confined to the lowlands, nor do black backs go with large size and spotted backs with small size, as was indicated by the material examined by Miller and Griscom when they described *Icterus sclateri alticola*. (See Amer. Museum Novitates, no. 184, September 24, 1925, p. 4.)

¹ Contribution from the California Institute of Technology.

Birds from Volcan San Miguel seem to represent a well marked race differing radically from *sclateri* in coloration. Its characters are designated as follows:

Icterus sclateri pustuloides, subsp. nov.

Type.—Male adult, no. 17,652, collection of Donald R. Dickey; Volcan San Miguel (3000 feet), Salvador; March 22, 1926; collected by A. J. van Rossem; original no. 10,727.

Subspecific characters.—Similar to *Icterus sclateri sclateri* Cassin in pattern of coloration, but yellow or orange-yellow areas of adult males replaced by intense orange, orange-red or flame-orange. In this respect some individuals are of almost the exact shade of *Icterus pustulatus* (Wagler), save that *pustuloides* averages less red (more orange) on auricular region and sides of throat.

Range.—2,500 to 3,000 feet on Volcan San Miguel, Salvador; occurring as a migrant in the lowlands (Lake Olomega, altitude 200 feet, September 11, and Divisadero, altitude 800 feet, September 30).

Remarks.—*Icterus sclateri* is only a summer resident in Salvador, and both forms disappear completely after the breeding season. The last fall record is October 14 and the first spring arrival was taken March 7. *Pustuloides* is therefore apt to be encountered in other regions.

Pustulatus and *sclateri* are obviously geographic representatives of a common stock and it is my strong impression that they should be regarded as specifically identical. However, I do not care to propose definitely such treatment until more birds have been examined. I am indebted to Mr. Dickey, and to Mr. Outram Bangs of the Museum of Comparative Zoology, for the loan of pertinent material.

Specimens examined.—*Icterus sclateri sclateri*: Costa Rica: Bolson, 1; Salitral de Miravalles, 1; Salvador: Lake Olomega, 5; Divisadero, 5; Sitio del Niño, 1; San Salvador, 8; "Guatemala", 3; "West Coast of Mexico", 1. *Icterus sclateri pustuloides*: Salvador: Volcan San Miguel, 8; Divisadero, 1; Lake Olomega, 1. *Icterus pustulatus*: Mexico: Sonora, 5.—A. J. VAN ROSSEM, 514 Lester Avenue, Pasadena, California, August 28, 1926.

Poor-wills Attracted by Arc Light.—Throughout a fairly long and diversified experience in the field, I have often speculated upon the fact that our higher vertebrates of nocturnal habits and insectivorous propensities are loath to take advantage of the banquets ready spread for them about any and every street lamp during summer evenings. Perhaps others have been more fortunate; but of such occurrences, all that I have observed in many years have consisted of a few bats and very occasional night-hawks (*Chordeiles*) flitting within the outermost periphery of the illumination cast by an arc light—an act casually indulged in by the birds and evidently without thought of repetition.

August 28, 1926, I was sitting, near midnight, on the observation platform of the California Limited as it stopped at Needles, California. It was with much interest that I then noted at least three Poor-wills (*Phalaenoptilus nuttalli nitidus* ?) hawking about a powerful arc light in the railway yards close by. The observation point of one of these was upon the top of a board fence well within the circle of illumination; of the others, some point out of my direct vision and just beyond the fence. One after the other, until my train left ten minutes later, they would flutter up in their quest for insects, not just somewhere near the light but apparently right against the glass globe which inclosed the arc, returning each time to their respective stations for observation.

Other observers have undoubtedly seen similar occurrences; but if the facts have been published I have failed to note them, and any change in the habits of a species, especially when it involves the use of some man-made contrivance, should be put on record.—A. BRAZIER HOWELL, U. S. National Museum, Washington, D. C., November 15, 1926.

A Proposed Summation of Lower Californian Ornithology.—BE IT KNOWN, that work is in progress by the undersigned on a "Distributional List of the Birds of Lower California". I am doing everything I feasibly can to bring into this list, before publication of it, every species known to have occurred in Baja California, or ever reported from that territory, even upon the slenderest evidence. A good part of my work naturally consists in the ransacking of literature; and I plan to give a bibliography of

titles covering the subject, as nearly complete as possible. I hereby invite assistance: clues as regards references in rare publications; information as to the basis of records, old or recent, where these are open to query, such as from known or suspected misidentification; and new information (localities, dates, and accurate determinations) based upon specimens or collections never published upon.

In this latter connection, there has been much collecting in Lower California and subsequent wide distribution of bird-skins, some of them very likely to furnish valuable facts of seasonal or local occurrence. All such facts should be at hand in order to make the proposed list as thoroughly inclusive as is possible at this stage in the growth of the ornithology of that interesting peninsula. I take this opportunity to thank certain students who already have furnished valuable information along one or another of the above lines, as follows: Messrs. O. Bangs, L. B. Bishop, D. R. Dickey, J. H. Fleming, C. W. Richmond, H. S. Swarth, J. E. Thayer, and A. J. van Rossem.

It may be of interest to some of my readers to know that, up to the present time (November 15, 1926), the Lower California bird list numbers 498 species and subspecies, though almost certainly a number of these will eventually have to be dropped into a "hypothetical list" (as being based on misidentification or upon mis-statement of locality). The number of titles in my Lower California bibliography now totals no less than 334.—J. GRINNELL, *Museum of Vertebrate Zoology, University of California, Berkeley, November 15, 1926.*

The Painted Redstart as a California Bird.—On October 28, 1926, Mr. Russell Hubricht described to me a bird that he had seen in Los Angeles that he could identify only as the Painted Redstart (*Setophaga picta*). At Mr. Hubricht's invitation, I visited the locality with him and had an excellent opportunity to study the bird at close range for some time.

I see no chance for doubt as to its identity and am ready to endorse unreservedly Mr. Hubricht's identification. I met this species in Arizona some years ago and have studied its more northern relative, the American Redstart, in the east and middle west. The actions, the size, the pattern, and the tones of coloration all check perfectly with the bird as seen in the Huachuca Mountains of Arizona. Especially fortunate were we in seeing the "fan-tail" act of the redstart, as it spread the tail and drooped the wings, while the body feathers were slightly elevated. This act is most advantageous in showing the white patches of wing, tail and shoulders, while the deep blood red of the ventral surface becomes evident as the bird turns about.

This individual seems to have taken station in a particular group of trees in one of the city parks, and it has been seen in this spot for five or six days passed. The Arizona range of the species is separated by a considerable barrier of desert from this California station, and the lines of migration along which it travels cannot pass very near. This appears to be a case of straggling that is more pronounced than that of the desert-inhabiting Vermilion Flycatcher or of the more northward ranging Eastern Kingbird, both of which species have been recorded from the San Diego region.—LOYE MILLER, *University of California, Southern Branch, Los Angeles, November 1, 1926.*

Some Incidents in the Life of a Screech Owl.—In previous issues of THE CONDOR (XXIII, 1921, pp. 97-98, XXVII, 1925, pp. 35-36) I have recorded my observations upon *Otus asio quercinus* as a breeding bird in this locality, and I told of the banding of one adult and four young on May 18, 1924. The adult received band number 226,191, and it is now possible to trace this bird through two more nesting seasons.

About March 1, 1925, I made a nest box, about 4"x4"x12" in size, with a circular entrance near the top, and a sloping, hinged lid, and I put it about fifteen feet from the ground in a tree about one hundred feet from the tree where the owls had nested the two previous seasons. On March 29, number 226,191 was in this box, and on April 5 she was there again, with two eggs. Fearing that she would leave if disturbed too often, I have only the following observations to offer: April 8, there were three eggs; April 12, four eggs; and April 19, five eggs; indicating a rather long period of laying, at least eight days being required to lay the last three eggs. On May 8, two of the eggs had hatched, indicating an incubation period of thirty days or more. On May 24, I banded four young, giving them numbers 226,196 to 226,199, inclusive. I do not know what became of the fifth egg; no trace of it was in the nest when the young were banded. By June 21, all of these young were out of the nest, but they were still being fed by the adults.

On March 14, 1926, number 226,191 was in the box again and was taken out so the number could be read. Then the box was visited several times without finding her there, and I had about decided that she had nested elsewhere when, on April 28, I found that she was in the box with five eggs. On May 8 there were six eggs; May 24, four of them had hatched; and on June 8, six young were banded, receiving numbers 367341-42-43-45-46-47. Two of these young left the nest June 20, two were still there June 23, and one was still in the nest June 28. After leaving the nest they remained in the locality for a while as a family group, being fed by the adults. But before long they drifted away to unknown hunting grounds. On September 7, 1926, number 226,191 was found dead, about one hundred feet from the nest box. She had been dead so long that there was no clew to the cause of death.

I have no data as yet on what has become of the fourteen young of number 226,191, banded during the three seasons. There are Screech Owls here, as they have been heard at night lately, and very probably another one will fill the place of number 226,191 when nesting time comes again. Will it be one of her children?—JOHN MCB. ROBERTSON, Buena Park, California, October 18, 1926.

The Meeting Place of the California and White-rumped Shrikes.—Intergradation is part of the definition of subspecies, and it has been generally assumed that in the region between the habitats of two subspecies of the same species the birds breeding must be intergrades, possessing to a greater or less degree the characters of each, and that this is true wherever two races come together in the breeding season. Doubtless this is true of some races everywhere and doubtless equally true of all at certain points where their summer ranges intersect; but it assuredly is not true of all species at all points of their juxtaposition. Thus Mr. Ridgway has recently shown in a very interesting paper, in *Bird-Lore* for September, 1925 (xxvii, p. 305), that in several species two races occupy the same territory near his home in Mount Carmel, Illinois; and I have found the same to obtain with certain species in North Dakota.

But very few studies seem to have been made by collecting birds breeding in a region where two subspecies closely approach, so I was especially anxious to learn how the two common shrikes of California, the White-rumped (*Lanius ludovicianus excubitorides*) of the Imperial and Coachella valleys and the California (*L. l. gambeli*) of the coast belt and most of the rest of the state, acted where their habitats approached. So, as opportunity offered, I have collected birds from this twilight zone, where intermediates would be expected. But such I have failed to find; either the ranges of the two were separated by territory apparently destitute of shrikes, or both occurred in typical form breeding in the same region, except in one locality, and even there breeding birds could easily be allocated to one race or the other.

The White-rumped Shrike, breeding abundantly in the low and hot Imperial Valley, I have found breeding as far west as Dixieland, thirteen miles west of El Centro, taking a female that had laid, and small young, on April 4, 1922 (nos. 34287-9); and I have no doubt this race occurs for a few miles farther west to where the escarpment rises rapidly to the San Diego mountains. In the forty miles between there and Potrero in the uplands I have seen no shrikes, but collected at Potrero a typical male breeding California on April 4, 1922 (no. 34305), a few hours after I had taken the White-rumped at Dixieland. Still farther west, both races may be found in winter, as the late Mr. Henry W. Marsden collected typical examples of both for me at Witch Creek in the winters of 1903, 1904 and 1907 (nos. 10234-5, 17259, 17261).

Northward from the Imperial through the Coachella Valley the White-rumped breeds commonly to Palm Springs, Riverside County, where I collected a breeding male and set of eggs on March 16, 1917 (no. 29833). Through the coast country, west of the divide, the California also breeds commonly, and at San Geronio Pass extends some miles to the desert side, where at Cabezon and Fingal I collected breeding males on April 7, 1919 (no. 31926) and March 21, 1921 (no. 34298). In the twenty miles

¹ By "typical" I refer in this paper in the case of the California Shrike to the bird of the coast region of California from Monterey southward to the Mexican border, without entering into the question whether this is the true *Lanius ludovicianus gambeli* of Ridgway; and with the White-rumped, to the bird of the vast territory from North Dakota south to southern Texas and northern Mexico and west to eastern California, though my two specimens of the species from Alberta and Manitoba so closely resemble the race known as *L. l. migrans* as to raise a doubt whether the subspecific appellations of these races are properly applied.

between Fingal and Palm Springs I have never seen a shrike of any kind, though the country seems suitable, and I have looked for them carefully the many times I have passed that way.

North of the San Bernardino, San Gabriel and Sierra Madre mountains, the first forming also the north side of San Geronimo Pass, stretches the Mohave Desert, connecting east of the mountains with the low land of the Coachella Valley, and on the west through Antelope Valley and passes with the San Joaquin Valley. At Bakersfield, Kern County, in the southern part of the San Joaquin Valley, on March 25, 1921, I collected two breeding male shrikes only a few miles apart, one a fairly typical example of the White-rumped (no. 34285) and the other of the California (no. 34299). One hundred and fifty miles southeast, but still in the western portion of the Mohave Desert, and just north of the San Bernardino Mountains, at Hesperia and Victorville, I collected two breeding adults of the White-rumped on April 8, 1919, and March 26, 1923 (nos. 31924, 34291), and five breeding birds of the California on March 7, 8 and 9, 1921, and March 28, 1923 (nos. 34295-7, 34307-8). Fifty miles farther northeast, but still in the Mohave, at Newberry Springs, I found two males of the California on December 7 and 11, 1917 (nos. 30502-3).

But the final and conclusive evidence that both races breed in the same region was obtained in 1924, when in country of the same character and elevation and much the same vegetation I collected a female California Shrike (no. 37066) with a set of seven fresh eggs on April 13, and a female White-rumped (no. 37065) with set of six fresh eggs on April 15, the nests being not seven miles apart, and both birds quite characteristic of their respective races.

Of course I have not been able to examine all the shrikes in this very extensive region, but my specimens indicate that in the 200 miles from the Mexican border north to the San Bernardino Mountains there is an intermediate district not occupied by either race in the breeding season; that for about 150 miles through the Mohave Desert and Antelope Valley from Victorville to Bakersfield both subspecies breed side by side; and that, if there is a place where one melts insensibly into the other, it must be farther north, in the San Joaquin Valley.—LOUIS B. BISHOP, Pasadena, California, May 19, 1926.

The Whistling Note of the Wilson Snipe.—On September 18, 1926, while hunting Jacksnipe (*Gallinago delicata*) on a meadow near Crane Lake, Dane County, Wisconsin, I heard one of these birds give a whistling note which seems to be worth recording. My notes written at the time are as follows:

"It was about sunset and dead calm. It had just ceased raining and the sky was overcast. My two boys and I had located a few snipe in a muddy hay stubble. I was standing in the middle of the stubble when I heard a series of whistling notes overhead. I immediately associated the sound with some sort of waterfowl, and looking up saw a snipe high in the air. His location corresponded with the direction from which the whistle had come. I kept my eye on him as he made a half turn around the meadow, and when he was directly overhead and not over eighty yards high I again heard the same whistle, this time definitely identifying it as emanating from the snipe. I noticed that the notes did not synchronize with the bird's wing beats. He spiraled down and alighted about 40 yards away, where I soon afterward flushed and missed him.

"The whistle was alike both times, and consisted of six or seven mellow whistling notes, all run together, each of the same low pitch, and each occupying the same time. The sound reminded me of one of the loon's calls, heard at a distance.

"I do not see how this whistle could have been other than vocal, because the intervals of a snipe's wing beats are irregular, like a dove's, whereas these notes were very uniform in interval. I did not see any dive which could have produced a whistle in the tail feathers, although his overhead position might have prevented me from seeing this. My son, who was standing a hundred yards to one side, thought the snipe dove at the time the sound was heard."

I believe that this is the same note as the one described by Forbush as "like the strong wing beats of some powerful waterfowl in flight". This is a convincing description of the sound I heard.

Forbush says, furthermore (*Birds of Massachusetts*, vol. I, 1925, p. 394), that this is the note that accompanies the nuptial song flight. He quotes Thoreau to the effect that it is most common in April. "European ornithologists", Forbush says, "believe

that the common snipe of Europe produces its so-called bleating by means of the two outer tail feathers which stand out clearly from the others during the downward plunge." Forbush himself possibly doubts whether the "bleat" is produced by the plumage. So do I, if it is the same note as I heard. It is hard to see how the plumage can produce any sound which is timed differently from the wing beats or independently of changes in the velocity or direction of the flight. For the tail to produce such a sound, one would have to assume an independent muscular impulse transmitted to the tail feathers.

However, since I have never before seen the song-flight, I am hardly competent to challenge the accepted theory as to its origin. Even if it be produced by the plumage, this instance of its occurrence in September seems worth recording. I believe that the snipe which I heard was not a migrant. The number of birds at Crane Lake remained stationary (about a dozen) from September 18 to October 9. On October 9 there was a noticeable accession of migrants, both at Crane Lake and at a number of nearby marshes.—ALDO LEOPOLD, *Forest Products Laboratory, Madison, Wisconsin, October 11, 1926.*

Rapid Decomposition in some Species of the Genus *Saltator*.—*Saltator* is a genus of finches occurring in tropical America. It is made up of quite an array of medium sized to very large forms. Within Costa Rica the genus is represented by at least five distinct species. It is brought to notice here because all these species seem prone to unusually quick decay after being killed, seemingly more rapid than in the case of any other land bird of approximately the same size with which I am acquainted. Temperature does not appear to be the controlling factor in this, for I have observed that *Saltator grandis* of the central tableland, and well within the temperate zone, can "ripen up" wonderfully within three or four hours after death; when species such as Solitary Sandpiper, Wilson Snipe, Texas Kingfisher and Paraque, killed within the same hour, will be wholly inoffensive. And it is well not to omit the fact that all these species of *Saltator* feed largely on fruit, at times on nothing else, occasionally gorging to the extent of the bill and portions of the head becoming discolored by the fruit juice.—AUSTIN SMITH, *San José, Costa Rica, September 6, 1926.*

The Blue Jay at Boulder, Colorado.—The Blue Jay (*Cyanocitta cristata cristata*, or *C. c. bromia*, if Dr. Oberholser's new name for the northern form is to be accepted) is a rather rare visitor to the western edge of the plains in Colorado. It is now added to the Boulder County list upon acceptable evidence. Clint O. Dumm reports having seen one on October 11, 1925, under excellent conditions for observation, positively identified by both himself and a man recently from the eastern states who knew the Blue Jay well. Mr. Dumm has himself long been familiar with our common Long-crested Jay (*C. stelleri diademata*), so often misnamed Blue Jay by non-critical observers. Furthermore, I have just received from School Superintendent William V. Casey, of Boulder, an excellent colored sketch, which he says was made from memory, of a Blue Jay in a flock of four that visited his home "about two years ago". He adds: "We fed them during the snowy weather, and they grew so tame that they did not fly away in alarm when I passed under the branch where they perched, eight or ten feet above my head." His description accompanying the sketch leaves no doubt that they were Blue Jays.—JUNIOUS HENDERSON, *University of Colorado, Boulder, October 16, 1926.*

Notes on the Black Oystercatcher.—At Point Lobos, Monterey County, California, Black Oystercatchers (*Haematopus bachmani*) have been observed procuring food for their young as late in the season as the date of this writing (November 3). Four of these birds, two adults and two full-grown young, apparently constituting a family, were seen on repeated occasions among a group of flat rocks exposed at ebb-tide and partially covered by weeds. On each occasion one adult was observed to be followed by one or two immatures.

When the old bird comes upon a limpet fastened to the rock, the crustacean is dislodged with considerable effort. By inserting the flat vertical surface of the bill underneath, the Oystercatcher loosens the animal by repeated jabs and steady prying, backed by its whole body and braced feet. The bivalve is then seized and carried to a suitable position, usually at some higher place on the rock. At this moment the immature bird comes close to the adult and waits patiently while the body of the limpet is

removed by similar prying from the shell. When the body is freed, it is placed upon the rock. The young bird then immediately grabs it. Sometimes, however, the morsel is taken directly from the bill of the adult.

This process was repeated indefinitely at the rate of about two limpets per minute.—LAIDLAW WILLIAMS, Carmel, California, November 9, 1926.

Curious Perching Behavior of English Sparrow.—The concrete sections of the Oakland-Alameda Estuary tubes are being constructed in the dry dock at Hunter's Point in San Francisco. These are circular in cross section and are covered with a layer of waterproofing, and then sheathed with planks.

While walking along beside one of these sections I saw a male English Sparrow (*Passer domesticus*) alight on the side of the tube, clinging there with his claws and bracing himself with his tail in a manner very similar to a Woodpecker. His tail was spread out like a fan beneath him, and he was pecking into a crack between two boards. I could not find out what he was after, though I am sure there was no food there, as the boards had only been in place a few days and were in a position on the horizontal diameter of the tube, where it would be almost impossible for food to lodge.—ERNEST D. CLABAUGH, Berkeley, California, October 17, 1926.

Western Mockingbird in Contra Costa County.—Whenever one who has lived in the East is told that there is a "Catbird" at some accessible place in northern California, there is at once renewed an interest in a noisy old friend and a faint hope is raised that he may actually find one of these rare birds. In such a frame of mind I went looking about for a "Catbird" among some Valley Oak trees about three-quarters of a mile east of Walnut Creek in the afternoon of November 21, 1926—to find the usual thing, a Western Mockingbird (*Mimus polyglottos leucopterus*). But considering that even this species is not at all common in the Bay region, its presence may be worth recording, although only a sight identification. I did not hear this bird utter a sound, but my friend's account of its vocal activities fortified my opinion, based on sight. He had seen the same bird in the same locality repeatedly and had heard its mimetic utterances. The bird had no dark rufous coloration under the tail and *did* have the white markings of our Western Mockingbird, which it certainly was.—CLAUDE GIGNOUX, 73 The Tunnel Road, Berkeley, California, November 22, 1926.

Designation of a Pacific Coast Subspecies of Chipping Sparrow.—For many years, since at least as long ago as 1901 (see Ridgway, Birds N. and Mid. Amer., pt. I, p. 316), systematic students have known that the Chipping Sparrow of the United States as a species is represented by three north-south racial sections, the eastern *Spizella passerina passerina*, the Rocky Mountain *S. p. arizonae*, and an unnamed Pacific Coast race—just as with many another moderately plastic bird. Apparently following the lead of Ridgway, who remarks (*loc. cit.*) "I hesitate to separate them" (that is, the Pacific Coast and Rocky Mountain forms, to both of which together he applies the name *arizonae*), no one to this day has ventured to name the westernmost race. I see no good reason for delaying longer; therefore:

Spizella passerina stridula, new subspecies. Pacific Chipping Sparrow.

Type locality and type.—Pasadena, Los Angeles County, California; male, probably more than one year old, because of its solidly chestnut crown; no. 35320, Mus. Vert. Zool.; collected March 28, 1896, by J. Grinnell; orig. no. 765.

Diagnosis.—Resembles *Spizella passerina arizonae* Coues, of Arizona and the Rocky Mountain region generally, but wing and tail averaging slightly shorter, and general tone of light areas not so pale: hind neck and rump darker gray, ground-color of dorsum clay color rather than cinnamon-buff [of Ridgway's Color Standards, 1912], and whole lower surface not so white save on throat, but more pervaded with gray of a faintly buffy tone; resembles *Spizella passerina passerina* (Bechstein), of the eastern United States, closely in dimensions and tone of under surface, but tone of coloration lighter, as follows: hind neck and rump less deeply gray, dorsum and occiput more narrowly black streaked, ground-color of dorsum clay color rather than dull tawny, and edgings on closed wing decidedly paler.

Measurements.—Average of 10 winter and early spring males of *stridula*, from the Pacific slope of Los Angeles County, California: wing 70.4 mm., tail 59.0; of 10

winter and early spring males of *arizonae* from the Colorado River valley, in Arizona and extreme eastern California: wing 71.8, tail 61.3. Chipping Sparrows being largely ground foragers, their flight feathers are subject to much wear; hence the greater value of dimensions taken from winter or early spring birds rather than from summer ones.

The Colorado Valley series, measurements of which were just given, show in maximum degree the color characters of *arizonae*, but they are not as large as Rocky Mountain birds. Compare with figures given by Ridgway, *loc. cit.* pp. 311, 315, 316.

Range.—The Pacific Coast district of North America, from southwestern British Columbia south, west of the western margin of the Great Basin, to and into northern Lower California.

Remarks.—I have examined specimens practically typical of the present race from southern Vancouver Island, B. C. (as far northwest as Parksville and Errington, latitude 49° 18' on the east coast), and thence from many localities south to and including the Sierra San Pedro Martir, latitude about 31°, Lower California. The characters of the race *stridula* are fairly constant to the west of the Sierra Nevada and Cascades. But from the higher Sierras and eastward among the Great Basin ranges the Chipping Sparrows are varying intermediate toward the race *arizonae*; indeed many specimens are indeterminate. However, I have seen none but good *arizonae* from the Colorado River valley, in southeastern California (where wintering) and from throughout Arizona.—J. GRINNELL, *Museum of Vertebrate Zoology, University of California, Berkeley, November 25, 1926.*

New Records from Big Bear Lake, San Bernardino Mountains, California.—We were at Big Bear Lake from June 20 to September 10, 1926, and made the following new records for birds in this locality, as far as we know.

Western Mockingbird. *Mimus polyglottos leucopterus*. One noted on the north shore of Baldwin Lake on July 15. It seemed strangely out of place among the pines, junipers and buckthorn, and was probably a straggler from the desert to the north or east, where the species is moderately common.

Western Kingbird. *Tyrannus verticalis*. During August this bird was fairly common about Baldwin Lake, and individuals were seen as far west as Fawnskin, on the north side of Big Bear Lake. The first individual was collected on August 1. This is an abundant breeder on the desert.

Sierra Crossbill. *Loxia curvirostra bendirei*. One bright red adult male tentatively identified by Dr. Grinnell as of this subspecies, was collected on the high ridge on the south side of Big Bear Lake on August 30. No others were seen, even though we spent considerable time hunting for them.

Western Golden-crowned Kinglet. *Regulus satrapa olivaceus*. This species, though much less common than the Ruby-crowned Kinglet, has been recorded before from the San Bernardino Mountains in summer. During August, adults and birds of the year were collected by us well up on the ridge above Pine Knot Post Office; and on August 28 a young bird, that apparently had fallen from the nest, was found. It was still too young to fly. This is a nesting record. Dr. Grinnell checked the identity of this specimen, also.

English Sparrow. *Passer domesticus*. On July 22, Sumner saw one of these pests, a male, on the main street at Pine Knot. None was seen later and we hope that the Bear Valley surroundings are unfavorable to this species and that this will be the last as well as the first record for the locality.

The following notes may be of interest though not first records.

Duck Hawk. *Falco peregrinus anatum*. A very dark colored bird of this species, which we took to be a female because of its large size, was seen on the east shore of Baldwin Lake on August 15.

Prairie Falcon. *Falco mexicanus*. A female was seen at close range on the south side of Baldwin Lake, also on August 15.

Black-necked Stilt. *Himantopus mexicanus*. Noted on August 1 on Baldwin Lake. After this date the species became abundant along the shores of both this and Big Bear lake. The greater part of the birds had departed by September 1, although individuals were noted at both places until the 10th.

Wilson Phalarope. *Steganopus tricolor*. Small bands of phalaropes were seen on Baldwin Lake on August 1 and several that were taken were of this species. By September 10 nearly all had moved on.—WRIGHT M. PIERCE and E. L. SUMNER, JR., *Claremont, California, November 9, 1926.*

EDITORIAL NOTES AND NEWS

In furtherance of the undertaking so successfully inaugurated in Los Angeles last spring, the Board of Governors announces that the Second Annual Meeting of the Cooper Ornithological Club will be held in the San Francisco Bay region, Friday to Sunday, April 29 to May 1, 1927. Tentative plans include sessions for the presentation of papers on various phases of ornithology on Friday and Saturday, a reception, a dinner for members and visitors, an exhibition of bird books, and opportunity to examine important collections of birds in the region. Two sessions will be held at the California Academy of Sciences, in San Francisco, and two on the University of California campus at Berkeley. The Annual Meeting of the Board of Governors will be held during the sessions. Dr. L. H. Miller, President of the Board of Governors, has appointed a local committee on arrangements for the meeting, consisting of Tracy I. Storer (Chairman), H. S. Swarth and Joseph Mailliard. Messrs. Swarth and Miller have been delegated to arrange for the program of scientific papers. It is hoped that a large number of Club members will contribute to the program, and that all subsidiary fields in ornithology will be represented. Facilities will be provided for demonstrations, lantern slides, and motion pictures. It is especially hoped that Club members from outside of California, who are planning to be on the Pacific Coast this spring, will arrange to include Berkeley and San Francisco in their itinerary during the time of the meetings. Further announcements will follow as soon as details are perfected.

Some interesting contributions have lately appeared in England in regard to longevity in birds. The literature is so full of unsupported but continually repeated stories as to the great age reached by various birds, that it is refreshing to have at hand some authoritative statements in this regard, even though not satisfyingly complete. In "British Birds", issue of August 2, 1926, Mr. H. F. Witherby, in reviewing a paper by Major S. S. Flower in the P. Z. S., properly points out that the ages reached by birds in cap-

tivity or in semi-domestication cannot be taken as indicative of conditions in the wild. Major Flower, from his experience in the Giza Zoological Gardens, in Egypt, found that "609 different species can live for over ten years, 137 species for over twenty years, and 41 species for over thirty years." "The longest lived individual bird which he admits definitely is an Eagle-Owl of 68 years." Mr. Witherby doubts whether banding will ever furnish reliable facts as to the age reached by wild birds, "since the individuals which escape accident and those which die and are not found or not reported are surely of greater importance in this respect than the small proportion which comes to hand." Furthermore, there is great likelihood of the band or the inscription on the band wearing out short of the full lifetime of the bird. Some ages of banded birds vouched for by Mr. Witherby are as follows: European Song Thrush, 8 years 10 months; European Blackbird, about 10 years; White Stork, up to 11 years; Common Heron, up to 15½ years; Herring Gull, up to 13 years (in captivity, up to 44 years). A final conclusion of striking interest is that "in general birds live longer than mammals."

THE RIDGWAY MEMORIAL CAMPAIGN.—Plans for the Ridgway Memorial are now being actively pushed by the Cooper Ornithological Club. As is now well known, this memorial will be a sanctuary for birds and other wild life—a tribute to Mr. Ridgway's services to science and to wild life preservation. Few ornithologists indeed have so richly as he deserved the love and gratitude of their fellow-men.

Mr. Ridgway's tract of land, known as "Bird Haven", situated near Olney, in southern Illinois, will be turned over by him to the Ridgway Memorial Association now incorporated under the laws of Illinois, for preservation and perpetual care. In order to carry out this plan a fund of \$35,000 is necessary. The project has been thoroughly endorsed by the Cooper Ornithological Club, the American Ornithologists' Union, and the Wilson Ornithological Club. The committee appointed to take charge of raising this amount con-

sists of Dr. Harry C. Oberholser, of the United States Biological Survey, Washington, D. C., Chairman, representing the American Ornithologists' Union; Mr. Harry Harris, Box 123, Eagle Rock, California, representing the Cooper Ornithological Club; and Mr. Percival B. Coffin, 39 South LaSalle Street, Chicago, Illinois, representing the Wilson Ornithological Club.

The active campaign for the fund is about to be launched, and all persons interested in wild life conservation as well as all bird lovers are urged to contribute. Let us all thus assure the perpetuation of Bird Haven as a wild life refuge and at the same time repay our debt to Robert Ridgway. Remittances should be made out to the Ridgway Memorial Fund and may be sent to any member of the above mentioned committee; but California contributions should all be sent to Mr. Harry Harris, Box 123, Eagle Rock, California.

PUBLICATIONS REVIEWED

BIRDS OF WESTERN CANADA, by P. A. TAVERNER. (Victoria Memorial Museum, Ottawa, Canada; Museum Bulletin no. 41; Biological series, no. 10; September 15, 1926; 380 pp., 84 colored plates, 315 text figs. Prices: 75 cents, paper cover; \$1.25, cloth.)

This will take its place as companion volume to the same author's previously published "Birds of Eastern Canada", the two together forming a satisfactory manual to the birds of that whole immense country. "Birds of Western Canada" covers the region from the Ontario-Manitoba boundary westward, including every species known to have occurred there. The book was prepared primarily as a "popular" manual, to convey information to an intelligent public, but one knowing little or nothing of the technicalities of ornithology. This purpose in the main has been excellently carried out; in fact the few criticisms that have suggested themselves to the reviewer are of such minor points and of such slight moment that there seems no need of dwelling upon most of them.

Introductory pages outlining the purpose and scope of the book are followed by explanatory comments upon such subjects as classification, nomenclature, geographical distribution, migration, the varied methods of bird study, and ornithological literature. A "key to the birds of western Canada" precedes the general accounts of the species. Under each species

are found in small type: the English name, scientific name, total length in inches and decimals, a brief description of the species (sometimes omitted when there is an illustration), "distinctions" (the salient points of the species as seen in specimens in the hand), "field marks" (features to be used in identifying the living bird), a brief description of the nest and its situation, "distribution", and, where more than one form is concerned, brief comments upon the several subspecific races. The large-type paragraphs deal mostly with features of the life history and of the economic status of the bird. Of the numerous colored plates, the majority are by Allan Brooks. The line drawings found throughout the text, in excellent supplement to the printed descriptions, are, I believe, mostly, if not altogether, the work of the author himself. A surprisingly large number of species are figured in the colored plates. Each plate includes two pictures. In some cases a picture includes two species or subspecies, and, wherever more than one figure of the same species appears, different plumages are shown. Although the pictures are small the artist's skill has brought out the salient points to be emphasized, and as the engraver, too, has done his work well, these illustrations are all that could be desired.

As the author emphatically states in his introduction, the Latin name, as here used, is always binomial. Subspecies are not accorded formal entry but are subordinated to mention in an explanatory paragraph. For the most part this is well enough; whether it will be entirely satisfactory remains to be seen. As examples of questionable treatment, the author's adherence to the rulings of the A. O. U. Committee on nomenclature obliges him to lump under single heads such widely diverse birds as the Slate-colored and Oregon Juncos, the several White-crowned Sparrows, and the equally diverse subspecies of Fox Sparrows and of Song Sparrows. Now, however the scientist may individually regard "degree of difference" as a criterion for specific separation, there is no doubt that the lay observer who turns to a "popular manual" for information will not be aware that there is any other criterion to apply. He will be puzzled, and some of us, who, for example, believe that the afore-mentioned Juncos are two distinct species, will sympathize with him. However, I am by no means inclined to quarrel with the author in his manner of meeting the difficulties

of nomenclature; quite the contrary, for in such a publication as this subspecies should unquestionably be accorded a very subordinate position. Mr. Taverner may, in fact, in this instance, ride his own particular hobby with little danger of colliding with any one. If he is in fault at all in the details mentioned—a debatable question—it lies in his attempt to follow consistently the rulings of some one accepted authority.

In any event, the user of the book will probably find it remarkably satisfactory in giving him the name and other information about the birds he sees. Too much can not be said in praise of a governmental policy that places a volume like this within reach of every one interested in the subject. It is a book for practical use, and it is also a beautiful volume, to be cherished in any library.—H. S. SWARTH, *Berkeley, California, November 27, 1926.*

BOOK NEWS.—A. L. Thomson's "Problems of Bird-migration", of which we spoke enthusiastically last year (*Condor*, XXVIII, pp. 186-187), has now been issued by an American publisher (Houghton Mifflin Company of Boston, 1926, price \$5.00). In our estimation this book supplants everything else to date as an authoritative digest of the facts and theories of bird migration.

H. E. and A. H. Walters' "Wild Birds in City Parks" has just appeared in its "Twelfth Edition, Revised" (The Macmillan Company of New York, 1926, price \$1.50). Evidently this book meets a popular demand, and scrutiny of it shows it to possess an exceptional degree of excellence, in its class, on both instructional and factual scores.

A book of obvious value to the aviculturist is Emilius Hopkinson's "Records of Birds Bred in Captivity" (H. F. & G. Witherby of London, 1926, price 15 s.). Also from the geneticist's point of view is this book of interest, in recording a great number of hybrids, some of astonishingly diverse parentage, such as the two families, the Weavers and Finches (though perhaps not on the best of evidence—see page 192).—J. G.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

AUGUST.—The August meeting of the Cooper Ornithological Club, Northern Division, was held at the Museum of Verte-

brate Zoology, University of California, Berkeley, on August 26, 1926, at 8:00 P. M. President Allen was in the chair and about seventy-five members and guests were present. Minutes of the Northern Division for July were read and approved. Reading of the minutes of the Southern Division for July was omitted.

As chairman of the committee appointed by the President, Mr. Swarth read the following resolutions and moved that they be adopted:

INASMUCH as in the death of Augustus Sayre Kibbe on August 21, 1926, the Cooper Ornithological Club has suffered the loss of a member who, in an unobtrusive way, had proved himself an important factor in the well-being and progress of the Club; upon whom we had learned especially to depend for sane and practical guidance in all matters concerned with wild life conservation; and who stood deservedly high in the esteem and affection of all of us; be it

RESOLVED, that the Northern Division of the Cooper Ornithological Club hereby place on record this statement of our feeling of grief at the loss we have sustained, and of sympathy with Mrs. Kibbe in the sorrow that has come to her; and be it further

RESOLVED, that the Secretary convey to Mrs. Kibbe a copy of these resolutions.

(Signed) Harry S. Swarth, Harold C. Bryant, Barton Warren Evermann, Committee.

Dr. Bade seconded the motion which was unanimously carried.

Mr. E. Raymond Hall reported seeing a Poor-will in Strawberry Canyon. Mr. R. H. Palmer reported having been told, when in the state of Washington last summer, of a sea bird which divides its time daily between the ocean and the mountain glaciers forty miles inland and asked if anyone could give him a clue as to the identity of the bird. Mr. George Haley advanced the theory that the birds may seek the glaciers in order to feed upon "glacier worms", annelids once believed to be mythical but now, according to Mr. Haley, given their rightful place by zoologists. Beyond this hint, Mr. Palmer's problem remained without elucidation.

Mr. Joseph Dixon presented the evening's program, telling "The Surf-bird's Secret". A splendid series of lantern slides illustrated the speaker's description of the mist-drenched mountain ridges of the McKinley National Park, where the father Surf-bird rears his young close by the trails of mountain sheep. At the close of the meeting all the oologists present were afforded an opportunity to see the first set of Surf-bird's eggs to be recorded, eggs now the property of Mr. John E. Thayer of Lancaster, Massachusetts, whose enthusiasm and financial aid helped make possible the expedition which resulted in their discovery.

Adjourned.—HILDA W. GRINNELL, *Secretary.*

SEPTEMBER.—The September meeting of the Cooper Ornithological Club, Northern Division, was held at the Museum of Vertebrate Zoology, University of California, Berkeley, on Thursday evening, September 23, 1926, at 8:00 P. M., with President Allen in the chair and about fifty members present. Minutes of the Northern Division for August were read and approved. Minutes of the Southern Division for August were read.

The name of Mr. Carl L. Carson, 6308 Broadway Terrace, Oakland, was proposed for membership by Mrs. Edwin T. Blake. A letter was read from Mrs. A. S. Kibbe expressing her appreciation of the resolutions adopted by the Northern Division in recognition of Mr. Kibbe's valuable services to the Club and to the conservation of wild life. Mr. H. S. Swarth called the attention of members to the "Official Check-list of the Birds of Australia", compiled by a committee of the Royal Australasian Ornithologists' Union, and commended the excellency of the work.

The evening's talk was by Mr. James Moffitt upon "Summer Birds of the Tahoe Region". Mr. Moffitt described the life zones and most prominent associations of the area under consideration and defined the summer ranges of many of the birds, digressing to urge Cooper Club members to devote a larger proportion of their time to the study of our game species which are rapidly lessening in numbers, whereas future bird students will probably find warblers and sparrows as plentiful as they are today. As an illustration of the fact that game and shore birds receive too little of the bird student's attention, Mr. Moffitt ventured to doubt whether half the members present realized that the opening of the duck season has been postponed for two weeks, a measure of real importance. Mr. Moffitt's talk reflected his keen interest in the region which he has chosen for intensive study. In closing he mentioned some records of out-of-range occurrence of certain high mountain birds, such as the Leucosticte which he had found this summer at so low as 8700 feet altitude.

President Allen called upon Mr. Harwell for his summer experience with the Rosy Finches in the Yosemite region, and Mr. Harwell told of finding a nest of young on the Mt. Lyell trail. At the close of the program Mr. Harwell whistled his interpretation of the Western Meadowlark's song and asked for critical comment, opening up so broad a field that discussion was postponed until a future meeting. Adjourned.—HILDA W. GRINNELL, *Secretary*.

OCTOBER.—The October meeting of the Northern Division of the Cooper Ornithological Club was held at the Museum of Vertebrate Zoology, Berkeley, on October 28, 1926, at 8:00 P. M., with President Allen in the chair and about sixty-five members and guests present. Minutes of the Northern Division for September were read and approved. Minutes of the Southern Division for September were read. Names proposed for membership were as follows: Miss Margaret Bevis, 2713 Haste Street, Berkeley, by Edna M. Fisher; Mrs. R. B. Carr, 2701 Claremont Blvd., Berkeley, by Joseph Dixon; Miss Kathleen Feugarde, 2713 Haste Street, Berkeley, by A. E. Borell; Miss Frances Payne, Biology Department, Alameda High School, Alameda, by Edna M. Fisher; Donald R. Skillen, Route 4, Box 90, Pasadena, by H. S. Swarth; George M. Wright, 1936 Thousand Oaks Blvd., Berkeley, by Joseph Dixon.

Mr. C. B. Lastreto announced that the Audubon Association of the Pacific now meets in comfortable quarters on the second floor of the San Francisco Ferry Building on the second Thursday of each month at 8:00 P. M. He invited Cooper Club members to attend Audubon meetings whenever possible.

Mrs. Fredericks reported having watched Pine Siskins eating eucalyptus seeds from pods on felled trees. Mrs. Allen told of noting Golden-crowned Kinglets this fall in advance of the Ruby-crowned Kinglets and asked whether others had shared this experience. Mr. Brighton C. Cain reported seeing a true Yellow-shafted Flicker.

President Allen welcomed Dr. Charles W. Townsend as a guest of the evening and reminded members of the pleasure given by his talk before the Northern Division in February, 1925. Dr. Townsend declined a request that he report upon the recent A. O. U. meeting, and instead spoke of some of the thrills of his winter in Florida, the rarest of his experiences having been the sight of the exquisite Roseate Spoonbill upon its nesting grounds.

The speaker of the evening was Mr. Charles A. Harwell, who for years has made an intensive study of the interpretation of bird music. Mr. Harwell exhibited a series of charts showing his graphic interpretations of the songs of many of our birds, and he whistled the notes of these and of many other species. Among the twenty-five kinds of birds discussed were those with such varying songs and call notes as the Meadowlark, Great Horned Owl, Canyon Wren, and Mourning Dove.

Mr. Harwell's rare ability as a whistler combined with the fidelity of his interpretations gave his hearers an evening of unusual pleasure and profit.

Adjourned.—HILDA W. GRINNELL, *Secretary*.

NOVEMBER.—The November meeting of the Northern Division of the Cooper Ornithological Club was held at the Museum of Vertebrate Zoology, Berkeley, on November 18, 1926, at 8:00 P. M. In the absence of both President and Vice-president Mr. Joseph Grinnell was elected chairman of the evening. About forty members and guests were present. Minutes of the Northern Division for October were read. Names proposed for membership were as follows: Miss Susan E. Chattin, 2626 Benvenue Avenue, Berkeley, California, by Mrs. J. Grinnell; Miss Beatrice Fay Howitt, 1390 Seventh Avenue, San Francisco, California, by Miss C. C. Pringle.

The chairman's call for recent observations by members introduced a veritable symposium upon the autumnal distribution of the Mockingbird in west-central California. Mr. H. C. Bryant reported mockingbirds as common just now in Concord, and a single individual was seen regularly the preceding week within two blocks of Euclid Avenue and Eunice Street, Berkeley. Mrs. Schlesinger reported a bird of this species for three successive days about her garden in Piedmont. Mrs. Calvert Meade reported several seen on the road up from Carmel. Mr. Clark P. Streater stated that during thirty years residence in Santa Cruz he had not seen Mockingbirds until six or seven years ago, since which time they have been present each fall about a fig tree full of ripening fruit near his home. Mr. Storer contributed the statement that for the last three years there have been at least three Mockingbirds about the University campus at Davis in the fall, a location where they had not previously been observed. Mr. Grinnell closed the discussion with a reminder that the northwesternmost record for the state is by Mrs. H. E. Wilder, who reported a bird from Ferndale, Humboldt County, and that the race *leucopterus* was first described, in 1839, from a specimen probably taken in the vicinity of Monterey, California, by the Beechey expedition.

Mrs. Edwin Mead told of the visit of a Red-breasted Sapsucker, seen boring into an apricot tree in her Etna Street garden, Berkeley. Mr. Cain reported having been told that the snowberry is poisonous to

birds, but was informed by members that this is a regular, though not favorite, food of some of our native birds.

Perhaps the most interesting contribution was Mr. Wanzer's experience with a Road-runner in Redwood Canyon. Trapped in the road ahead of his automobile by the dense brush on either hand, the bird ran easily ahead of the machine when the speedometer registered ten miles; at twelve miles the bird still ran; but at fourteen the wings were brought into use and the bird soared eight feet between footsteps.

Mr. Grinnell placed before the Club for inspection the newly-issued "Birds of Western Canada", written by Mr. P. A. Taverner and illustrated largely by Major Allan Brooks. Attention was called not only to the excellence of the writing and the superior quality of the illustrations, but also to the generosity of the Canadian Government in placing the book before the public at a price far below the actual cost of publication.

"Experiences of a Federal Inspector of Foreign Birds" was the title of the paper of the evening, presented by Mr. H. S. Swarth. Members were interested to learn of the large number and wide variety of foreign birds received at the port of San Francisco. During the years he has served as inspector Mr. Swarth reported having listed ninety species of gallinaceous birds alone, fifty-four of pigeons, seventy-eight of parrots, and fifty-four of Old World finches. It was a pleasure to learn that the fifty cents duty per bird now charged has resulted in better care of travelling aves. Close attention was given Mr. Swarth's carefully prepared talk, showing the wide variety of interests maintained by our membership.

Because of the approaching holidays it was voted to hold the December meeting of the Northern Division at an earlier date than usual, upon the sixteenth. Before adjourning the meeting the chairman called attention to the fact that five drinking and bathing basins for birds have been placed upon the lower campus, and he asked that members observe and report upon the extent of their use by the birds. Adjourned.—HILDA W. GRINNELL, *Secretary*.

SOUTHERN DIVISION

AUGUST.—The Southern Division of the Cooper Ornithological Club held its regular monthly meeting Tuesday evening, August 31, 1926, at the Los Angeles Mu-

seum, Exposition Park. Eleven members and friends were present. In the absence of the president and vice-president, Mr. Wyman was called on to act as chairman. The minutes of the July meeting were read and approved. The minutes of the July meeting of the Northern Division were read.

The following names were proposed for membership: Dr. H. W. Mills, P. O. Box 275, San Bernardino, Calif., by W. Lee Chambers; George Benson, Voltage, Harney County, Oregon, by Stanley G. Jewett; Charles R. Frazier, 281 E. 15th St. North, Portland, Oregon, by Stanley G. Jewett; Ed. S. Steele, Reserve, New Mexico, by W. Lee Chambers; John Basye Price, Box 733, Stanford University, Calif., by Harold Michener.

A communication from the secretary of the Northern Division was read, in which the death of Mr. A. S. Kibbe was reported. Mr. Kibbe has been one of the most faithful members of the Cooper Club for many years.

The meeting was then turned into a round-table talk in which nearly everyone present took part, telling of the birds that had been seen. Mr. Hubricht told of seeing a Cooper Tanager at Sierra Madre on August 29, 1926. There was no doubt in his mind of the correct identification of the bird. Mr. Michener told of his son Charles having carefully observed two red birds at the Michener home in Pasadena. The description of the birds and reference to colored pictures led to the conclusion that they probably were Cooper Tanagers. This was on July 5, 1926. It was pointed out that these birds might have escaped from some aviary. Mr. Wyman told of having seen a large flock, perhaps 175 in number, of Elegant Terns at Playa del Rey early in August. They had been seen by others for some time before he saw them. He explained that such large numbers of them had never before been reported along our coast; in fact, they were so rare here that very few people had seen them at all before. Mr. van Rossem told some interesting things about the birds of Salvador. Many other items of interest were presented and discussed. Adjourned.—HAROLD MICHENER, *Secretary, pro tem.*

SEPTEMBER.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held September 28, 1926, at the Southwest Museum, Marmon Way, Los Angeles, at 8:00 P. M. The meeting was called to order by President

Bishop with forty-five members present. Minutes of the Southern Division for August were read and approved. Minutes of the August meeting of the Northern Division were read.

The following names were proposed for membership: Dr. Wm. C. McKechnie, Vancouver, B. C., Canada, by J. W. Wursen; E. L. Bickford, First National Bank, Napa, Calif., by H. C. Bryant; Wilfred Lyon, 2423 Elmgrove, Los Angeles, Calif., by Roland C. Ross; H. H. Garner, 250 W. First St., Pomona, Calif., by J. Eugene Law; Russell Hubricht, 1023 W. 8th St., Los Angeles, Calif., and Dominic Louis Serventy, Railway-parade, East Cannington, Western Australia, by Harold Michener; Frank G. Grasett, Green Bay Rd., Glencoe, Ill.; Dr. L. J. Cole, Univ. of Wis., Madison, Wis.; Martha Heermans, Hayden, Ariz.; Richard H. Pough, 4 Lenox Place, St. Louis, Mo.; John Bartram, West Chester, Penn.; Harold Wing, Jackson, Mich.; Loring W. Turrell, Smithtown Br., Long Island, N. Y.; Benjamin Hoag, Garfield, Rensselaer Co., N. Y.; Karl Plath, 2847 Giddings St., Chicago, Ill.; Edward A. Preble, 3027 Newark St., Washington, D. C.; Samuel E. Perkins, 701 City Trust Bldg., Indianapolis, Ind.; S. Gilbert Emilio, 156 Hobart St., Danvers, Mass.; George W. Friedrich, 3029 Belmont Ave., Chicago, Ill.; Frank B. Foster, P. O. Box H, Haverford, Penn.; Dr. Alexander W. Blain, 2201 Jefferson Ave., Detroit, Mich., and Archie Hull, Brigham City, Utah, all by W. Lee Chambers.

Mr. Ross raised the question of the protection of the Sage Hen in the state and told of his estimates made in Mono County. He believes that the population of the birds is being greatly reduced and that the season should be permanently closed. Similar opinion was voiced by several other members.

Mr. Sidney Peyton reported the collecting of two sets of Poor-will in Ventura County during the past season and produced evidence to show that the birds breed twice in a season.

The speaker of the evening, Dr. Loye Miller, gave an account of the Nature Guide Service in Crater Lake National Park during the past summer. The educational value of the work was stressed both as regards ornithological interests and general recreational work. Several points of interest were mentioned regarding the avifauna of this region as worked over by the Nature Guide Staff.

Adjourned.—ALDEN H. MILLER, *Secretary.*

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